Dental Abstracts

a selection of world dental literature

AMERICAN DENTAL ASSOCIATION

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AMERICAN DENTAL ASSOCIATION

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2. To provide, by a few hours' reading each month, a survey of the significant advances being made by dentistry throughout the world, as reflected in current dental literature; and

3. To supply enough data in each abstract so that the reader may determine whether he wishes to refer to the original article for more complete information.

The abstracts are grouped in broad classifications. The specialist will learn from this periodical of work done in other fields as well as in his own. The general practitioner will be able to keep abreast of modern knowledge in the various specialties. Articles from which abstracts have been made are on file in the Library of the American Dental Association and may be borrowed by members of the Association. Requests for articles should be addressed to the Bureau of Library and Indexing Service, American Dental Association, 222 East Superior Street, Chicago 11, Illinois. Only three articles may be borrowed at one time, and they may not be kept longer than one week. No charge is made to Association members for this service.

Oral surgery

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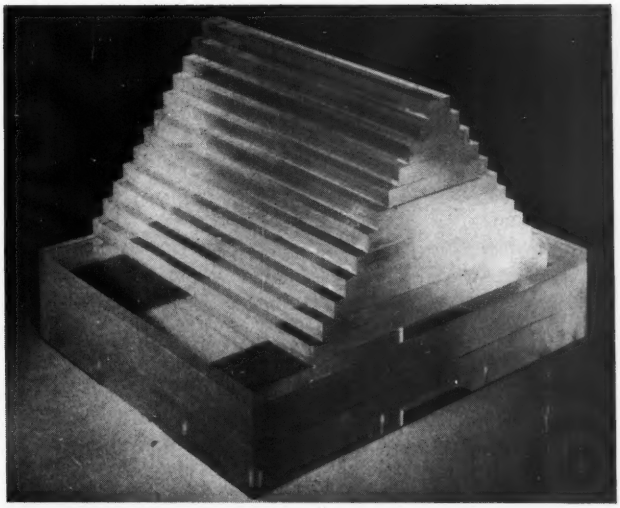
Roentgenology



Device for standardizing x-ray techniques

N. C. Leone. *Pub.Health Rep.* 72:76 Jan. 1957

A large plastic stepped wedge, which facilitates the coordination of research facilities, roentgen film, equipment and technical procedures providing a high degree of uniformity in results, is being used by the Medical Investigations Branch, National Institute of Dental Research, Public Health Service. The wedge was developed by Herman E. Seeman, of the research laboratories of the Eastman Kodak Co.

The dimensions of the wedge are such that its thinner sections require the same roentgen-ray exposure as thin patients, and the thicker portions correspond similarly to heavy patients. In use, roentgenograms are made several times with a variety of technics representative of those used for the normal range in patient size. The roentgenograms and data are filed for later reference.

At a prescribed time, say a year later, roentgenograms are again made of the wedge. If the roentgenograms match those made the year before, it may be concluded that no significant change has occurred in the equipment or materials used. If the roentgenograms do not match, the technics or processing are modified until a match is obtained or film interpretations are made on the basis of the variation. In this manner, it is possible to maintain a given diagnostic film quality even with a variety of changes.

The plastic wedge constitutes a tool, particularly adaptable to field use, that affords a large degree of uniformity in procedure and results. The device permits a practical degree of standardization for studies, film, developer, equipment or technic changes. It serves to check on roentgenographic quality.

Roentgen ray diagnosis of cysts of the jaw with the use of contrast medium

(Leukakystojen röntgendiagnostiikasta varjoaineen avulla)

Juuso Kivimäki. *Suom. hammaslääk. toim.* 52:1-4 March 1956

The use of contrast mediums in dental roentgenographic diagnosis has been uncommon, except when they have been mixed with filling materials to establish complete filling of the root canal. Originally a contrast medium containing iodine was used, but barium and zinc oxide replaced iodine with the introduction of guttapercha as a filling agent. Contrast mediums are used in sialography for study of the pathologic changes of the salivary glands and their ducts. To

some extent they are also used in the examination of the maxillary sinuses, particularly when there are cysts.

Liquid agents have been unsatisfactory, however. Only a powdery substance that would lightly veil the inner walls of the maxillary sinuses appeared to be suitable. The author's tests with the insufflation of iodoform powder into the maxillary sinuses disclosed that this agent spreads nicely over the mucous membrane lining the sinuses. It permits determination of dimensions of the sinus and the thickness of its mucous membrane. If a cyst is to be studied, its contents are aspirated. A second needle is introduced alongside the aspirating needle, and the iodoform powder is blown through the first needle, with the air escaping through the second needle.

Despite its generous iodine content, iodoform powder is relatively safe. Being a light compound, its total iodine content is small, and the iodoform is rapidly absorbed by the tissues, disappearing from the body. The patient's sensitivity to iodine and possible diseases of the thyroid gland must, of course, be taken into account.

Pathologic changes in the oral cavity, caused by radiation disease

(Patologitscheskie ismenenia v polosti rta pri lutschevoi bolesni)

A. T. Rudenko. *Stomat., Moscow* 4:4-11 July-Aug. 1956

In recent years two authors, Burstone (1951) and Ribakow (1954), have published articles with detailed studies of the pathologic changes in the oral cavity caused by exposure to roentgen rays or other radiation. This induced the staff of the Naval Medical Academy to undertake research in this subject.

Thirty-three rabbits were exposed to roentgen rays. Nine animals were exposed once to 700 r, 17 to 1,000 r and 7 to 2,000 r.

All the animals were affected in direct proportion to the amount of radiation. A comparison of the findings showed that the common symptoms accompanying intensive radiations, such as leukopenia and gastrointestinal upsets, were most severe in the seven animals exposed to 2,000 r; they died in from 5 to 21 days. The animals exposed to 700 r showed a moderate leukopenia (leukocyte count, 3,000 to 3,500) and after three weeks a tendency to leukopoiesis was observed. Only one of these animals had intestinal dysfunction for three days. The pathologic changes in the oral cavity were directly dependent on the degree of roentgenization.

For the microscopic analysis 165 specimens from the mucous membranes of the palate, cheek, the tongue and mandible, with teeth of the 33 rabbits and, for control, 20 specimens from 5 rabbits not exposed to radiation, were prepared. No significant changes were noted in the group exposed to 700 r. In the second group (1,000 r) the mucous membrane of the cheeks of three animals showed signs of parakeratosis and hyperkeratosis, and one of this group had necrotic changes on the tongue and glands.

The most severe changes occurred in the form of ulceronecrotization of mucous membranes of all the tissues of the mouth on the animals exposed to 2,000 r. The tongue, palate, the alveolar process and the area of lingual tonsils were involved. A dark grayish layer covered the palate, could be removed easily and was found to be necrotic mucous membrane infiltrated with microorganisms.

Characteristic of these changes was the absence of the usual inflammatory reaction at the border of the necrotic tissues. Apparently the production of leukocytes, the most vital reaction, when there was an abundance of microorganisms, was out of balance.

Measurement of skin dose and stray radiation by dental roentgenography

(Matning av huddos och sekundärstråling vid dental roentgenfotografering)

K. Bjorlin, J. Cederlund and B. Lindahl. *Odont.Revy* 7:242-254 April 1956

In evaluating radiation hazard the amount of radiation is not the only important factor. Length of exposure, type of roentgen rays used, size of exposed area, and individual sensitivity should also be considered. Because of variations in in-

dividual sensitivity a "safety dose" has been introduced in Sweden. It has been set at 100 r which is one third the radiation necessary to produce a skin erythema in the most sensitive patients.

An investigation was carried out to determine the skin dose in the primary target area using different types of roentgen ray apparatus. At the same time secondary radiation was recorded.

A human cranium was filled and covered with wax so that radiation absorption similar to that of the human head was obtained. The phantom was mounted at a distance from the floor comparable to that of the head of a seated patient.

The skin dose was read directly on a Philips dosimeter, and the secondary radiation was registered with two ionization chambers. Three different types of roentgen ray apparatus were used. All measurements were taken with the beam focused on the upper right first molar.

For each apparatus the skin dose was calculated on the basis of 72 measurements with a total exposure time of 2,135 seconds. With each apparatus the safety limit was reached after a different total exposure time. With one, 100 r was delivered during a total period of 30 seconds, with another during 33 seconds and with the third during 44 seconds.

The secondary radiation was measured at 12 radial points at three levels. It was found that the operator, during exposure, should not stand opposite the roentgen ray tube. In any other direction he should be at least five feet from the patient. When taking films of the molar and bicuspid regions, the operator should stand behind the patient's head where secondary radiation was found to be very slight.

Protection from x-ray radiation in the dental office

William F. Via, Jr. *Detroit D.Bul.* 25:16-18 Oct. 1956

The National Bureau of Standards Handbook 60 defines the maximum permissible dose of roentgen-ray radiation for persons operating x-ray equipment for an indefinite period of time as 300 milliroentgens or 0.3 r per week for those in the age bracket 18 to 45, and 600 mr. per week for those persons over 45. This dosage is exceeded if the operator stands in the way of the useful beam at a position closer to the machine than 35 feet with no intervening protective screen if the office has a workload of 200 milliampere minutes per week. Most busy dental offices have a workload in excess of this amount per week.

To promote safety and to protect dental office personnel, all office personnel who work within 35 feet of the x-ray machine should be monitored. To mutate the genes of dental auxiliary personnel is a poor reward for the years of their faithful service to the dentist.

Monitoring devices are readily available at a nominal cost. The simplest and most useful is the film badge, consisting of a dental size film packet with a strip of lead or a copper pyramid attached to its surface and enclosed in a suitable container which may be carried in the pocket or clipped onto the outer garment. At the end of the monitoring period (usually one or two weeks) the company supplying the film badge sends a new badge, and the used badge is returned to the company for analysis. If the wearer has exceeded the maximum permissible dose, he is notified by telegram.

If, after monitoring the office personnel for four months, it is found that no one has received radiation in excess of a quarter of the maximum permissible dose or 75 milliroentgens per week for any monitoring period, the film badges may be worn for one month each, thus the cost will be reduced.

Should the monitoring service report that the dentist or any of his office personnel is receiving radiation in excess of the maximum permissible dose of 300 milliroentgens per week, immediate steps must be taken to protect those persons who have been overexposed.

The division of occupational health of the Michigan Department of Health will survey a dental office and recommend the necessary protective measures if the office has been proved unsafe after the personnel has been monitored.

The names and addresses of nine companies in various parts of the United States offering film badge monitoring service are listed.

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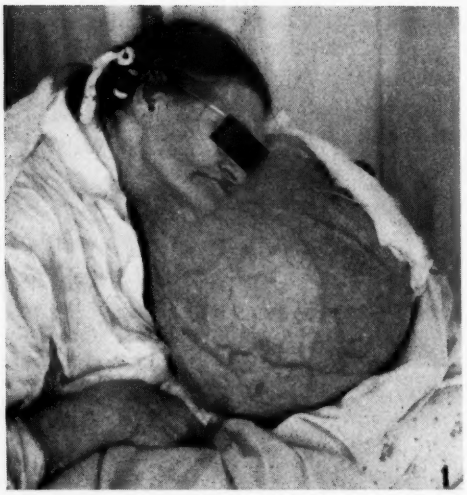
Surgical pathology

An unusual tumor

J.R. Frylinck. *South African M.J.* 30:479
May 19, 1956

A 63 year old European woman was admitted to the Boksburg-Benoni Hospital because she had sustained a severe hemorrhage from the surface of a large tumor on her face. The tumor had been present for 30 years. It seemed to be growing from the side of her face and neck, but no exact site of origin was discernible. The tumor had pulled her head down. The tumor rested quite comfortably on her knees when she was in the sitting position. Large veins coursed over its surface; one of these had ruptured but was easily controlled by pressure.

The operation for removal of the tumor presented no difficulty. The center of the tumor contained 3.5 gallons of turbid fluid. The solid cortex weighed 25 pounds and the total weight of the mass was 60 pounds. The wound healed satisfactorily but the patient was left with facial paralysis on the side operated on, indicating that the tumor originated in the parotid gland.



The tumor tissue was submitted to the Oral and Dental Hospital, Johannesburg, which reported that the microscopic structure was that of a mixed salivary tumor.

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Surgical technics

The facial nerve in parotid surgery

Oliver H. Beahrs and Bernard F. L'Esperance.
J.A.M.A. 162:261-263 Sept. 22, 1956

Surgical treatment of the parotid gland in the past has been influenced by the intimate relationship between the parotid gland and the facial nerve. The dread of damaging this nerve has been paramount in the minds of surgeons dealing with lesions in this region. Paralysis of the nerve produces disfigurement with psychic trauma. Damage to the facial nerve is hard to avoid if the nerve is not well exposed. A good exposure makes it possible to choose between removal of the superficial portion of the gland and total removal of both superficial and deep portions by careful dissection.

If there is a malignant tumor in the gland, excision must be total and the nerve usually must be sacrificed. The nerve or a portion of it may be preserved, however, in selected instances in which the nerve is free of the tumor or in which the tumor is of a low grade of malignancy or is well encapsulated.

Nerve grafting, using a section from the greater auricular nerve to bridge the gap between the main trunk of the facial nerve and its peripheral

branches, was successful in preventing permanent facial paralysis, in a 50 year old man operated on at the Mayo Clinic in January 1954. Examination of facial function in June 1955 revealed good gross motion of all groups of muscles supplied by the facial nerve.

Plastic surgery of the cleft lip on the first day after birth

(Plastika verchnej gubi pri sajatchej gube v pervij djenj posle roschdenija rebjonka

L. E. Frolova. *Stomat.,Moscow* 4:37-39 July-Aug. 1956

There is no agreement between the various clinical specialists as to the proper time when the surgical correction of the cleft lip should be undertaken.

Since 1951, in the clinics of the Medical Institute of Tashkent, cleft lip operations were performed only after the sixth month of life by the method introduced by L. M. Obuchow. All patients were kept under continuous observation and thoroughly analyzed. The successful results in obtaining sound functional and cosmetic effects led to the decision to operate on the cleft lip immediately after a baby with this deformity was born.

During two months in 1956, cleft lip surgery was performed on five newborn babies aged 4, 28, 38, 44 and 86 hours. Three had complete unilateral cleft lip with associated clefts of the soft and hard palates and breech in the alveolar process. The fourth had cleft lip and partial cleft of the hard palate, and the fifth baby had a complete unilateral cleft lip with a deformed alveolar process.

Under local anesthesia, by injection of 0.5 per cent procaine hydrochloride, the babies withstood the operations well. The continuity of the lip was fully restored and the plastic surgery on the palate and the alveolar process and the correction of the ala of nose were completely satisfactory.

During the postoperative period penicillin therapy was used with 50,000 units every five to six hours for from six to seven days.

On the first three days after the operation, the babies were fed by spoon. From the fourth day on, the babies were breast-fed, or fed by the ordinary nipple.

The sutures were removed on the eighth postoperative day, and four babies were discharged, with gains in weight of from 100 to 150 Gm. One baby, operated on 44 hours after birth, died 3 hours 15 minutes after the operation. The postmortem examination showed aspiration pneumonia with changes in liver and spleen. Clinically those changes could not be observed before, and obviously the operation speeded up the terminal outcome.

Operating on congenital cleft lip in all babies within 24 hours after birth, is advocated. The patients withstand the operative procedure better, with satisfactory functional and cosmetic results. The nourishment of babies improves and the usual mortality rate of deformed babies during the first two months of life is reduced.

The surgical treatment of trigeminal neuralgia

Wallace B. Hamby. *J.Internat.Col.Surgeons* 26:305-311 Sept. 1956

Trigeminal neuralgia has been known for centuries. Eventually, partial resection of the trigeminal root became the standard treatment for tic douloureux and was, as late as 1945, acclaimed the most perfect operation in surgery. Because it was performed most often on patients more than 60 years old, with a mortality rate of less than 1 per cent, and because it relieved one of the most agonizing afflictions to which mankind is heir at the cost in morbidity of only partial loss of sensation in part of one half of the face, this operation seemed justified. Neurosurgeons, however, continued to set the goal at relieving the pain without loss of sensation.

In 1952 Taarnhøj of Copenhagen described a new method of relieving tic pain without desensitizing the face. Through a small temporal craniotomy he opened the dura and lifted the temporal lobe from the floor of the middle fossa, exposing the tentorium and the dura over the sensory root. The dura over the root was identified and opened, the incision extending backward to slit the tentorium to its free medial border. The superior

petrosal sinus was transected, laying wide open the porus trigemini, the dural ring through which the root extended from the middle to the posterior fossa. This stopped the tic pain, and, since the root was not damaged, no numbness resulted.

In 1954 Arest Stender of Berlin reported he had brought about relief of tic douloureux simply by exposing the sensory root and the gasserian ganglion and stripping the dura propria off its surface. He called this "trigeminal gangliolysis." For several years, Hunter Shelden of Pasadena had been exposing and enlarging the foramens ovale and rotundum, through which the second and third divisions enter the skull. Usually the pain was relieved.

It seems likely that the effect of the operations of Taarnhøj, Stender and Shelden is much the same, and that opening the porus trigemini is not essential in Taarnhøj's operation.

The long-term effect of these newer operations is not yet known. Pain recurs in some patients. In the author's experience, pain has recurred after 13 (43 per cent) of 30 Taarnhøj operations, and in 2 (10 per cent) of 20 Shelden operations.

It seems justifiable to perform the simpler Shelden-Stender operation for tic douloureux. The patient is told that experience thus far indicates a 70 per cent chance of relief of pain without noticeable sensory loss in the face. Should the pain recur, it is relatively simple to reopen the wound and sever the fibers.

The management of lingual cancer

Frank E. Berridge, Jr., and Arthur G. James. *Surg.,Gynec.&Obst.* 103:595-606 Nov. 1956

The tongue is the most frequently involved site of cancer arising in the oral cavity. Malignant tumors of the tongue cause more deaths each year than any other head and neck cancer. In the head and neck region, the incidence of lingual cancer is second only to that of cancer of the lip (excluding skin cancer). Cancer of the tongue accounts for 2 to 3 per cent of all human cancer and about 1 to 2 per cent of all fatalities resulting from malignant disease.

Certain clinical and pathologic aspects of 102 consecutive patients with primary lingual cancer, admitted to the head and neck service of the Ohio State University Hospital from 1948 through 1955, are discussed.

Cancer of the tongue might be considered as two different diseases, depending on whether it arises anterior or posterior to the circumvallate papillae. The anterior tongue cancers are nearly exclusively squamous cell carcinomas and are usually located on the lateral margin. Most women patients with squamous cell carcinoma have their tumors located anterior to the circumvallate papillae. By contrast, cancer of the posterior third of the tongue appears more frequently in men, and the predominance of squamous cell carcinoma is less pronounced. When eventually discovered, the primary lesions are usually large, and palpable lymph nodes were evident on admission in 54 per cent of the patients with cancer of the base of the tongue.

Syphilis appeared to be a significant predisposing factor only for squamous cell carcinoma arising on the anterior two thirds of the tongue. The decreasing incidence of syphilis in the general population and the increasing tobacco habit in women may account for two discrepancies in this series, as compared with other series. First, the men did not predominate greatly, particularly in the group of persons found to have cancer of the anterior two thirds of the tongue. Second, there was a decreased incidence of lesions of the anterior two thirds of the tongue. Thus, it seems possible that oral hygiene and smoking, rather than syphilis, are playing a more decisive role in the predisposition of certain persons toward cancer of the tongue.

The surgical treatment of lingual cancer is most uniformly successful. The primary tongue tumor can be excised easily with little jeopardy of life or inconvenience to the patient. More extensive dissection is required in the presence of mandibular, cervical or epiglottic involvement; or surgery may be coupled with interstitial implantation of radioactive iridium to obviate the need for occasional operative sacrifice of the common carotid or internal carotid arteries and to sterilize other sites of nonresectable tumor tissue. External radiation therapy has been employed chiefly as an adjunct to interstitial irradiation. Technical aspects of the surgical treatment of lingual tumors are discussed.

First-aid treatment of bullet wounds in the maxillofacial region
(Primarna obrada strelnih povreda maksilofacijalne regije)

Alfred Štajner. *Vojnosan.pregl.,Belgrade* 13:229-236 May-June 1956

First-aid treatment of bullet wounds in the maxillofacial region does not differ in principle from treatment which usually is applied at the army base hospital; the only difference exists in the method used.

In the field, treatment is limited to a minimum. Its main aim is to relieve pain and prevent complications. Some wounded soldiers require little preliminary treatment before they can be transported to the base hospital. Others may require the application of temporary dressings or the support of a fractured mandible by simple bandages.

Some bullets embedded in the jaws, however, can cause loss of control of the tongue, and in such instances immediate treatment is required to save life.

The treatment of gunshot wounds of the jaws can be divided into three distinct stages. The first phase, which extends from the time of injury to one or two days afterwards, is often the most critical period because of the dangers of asphyxia, loss of blood, shock, unbearable pain and mental depression. Treatment in the second stage consists of immobilization of bone fragments through ligatures and splints, and control of infection which may cause pulmonary complications or secondary hemorrhage. During this second, prereconstructive phase, the temporary suture of the bullet wounds can be carried out. The third phase is devoted to the reconstruction which follows healing of the tissue. After evacuation of the patient to an interior zone, reconstructive surgery, although often interrupted by periods of convalescence, may be attempted.

The hazards to life in initial surgical management of bullet wounds in the maxillofacial region frequently are greater than those associated with the original wound. There should be no hesitancy in performing tracheotomy when indication is present that obstruction of respiration can be relieved by an immediate surgical opening into the trachea through the neck.

The selection of the suitable anesthetic and of the technic for its administration require expert judgment and skill.

The procedures of initial surgery are based on the following principles: (1) reduction and fixation of fractures of the osseous foundation structures; (2) elaborate and precise splinting of fractures; (3) isolation of the buccal cavity from wounds of the bone and superficial soft parts by suture of the mucous membrane; (4) primary closure of muscles and skin, with adequate provision for drainage to prevent infection, and (5) application of moist pressure dressings.

The management of bullet wounds in the soft tissues of the maxillofacial region, with or without plastic repair, should not influence the surgeon to keep the patient for supervision of healing at a station near the front. Such a procedure could cause unnecessary postponement of the splinting of fractured parts.

In instances of severely comminuted fractures or extreme loss of bony substance with major soft tissue defects, evacuation to a hospital in the interior zone is required as soon as the patient is able to care for himself, and after the dangers of infection have passed.

▼ Plantation

Methods and criteria of intraosseous and subperiosteal implants
(Méthodes et critique des implants dentaires intra-osseux et sous-périostés)

Otto Gubelmann. *Rev.mens.suisse odont.* 66:228-235 March 1956

At the Polyclinic of the Dental Institute of the University of Geneva, Switzerland, the author's technic of intraosseous and subperiosteal implants for complete lower dentures has been tested.

The main purpose of this technic is to secure four fixed abutments in an edentulous jaw. These abutments, in cuspids and second molars, serve

as support for the denture, be it a partial or a complete denture or even a fixed bridge.

An adaption of a metal cast to the surface of the mandibular bone below the periosteal mucosa should be made. The cast is supplied with four ridges piercing the mucosa and serving later as abutments.

A high degree of cooperation and coordination between the oral surgeon and the prosthodontist is required, each with a mutual understanding of the problems and the responsibilities of the other. Under the supervision of the prosthodontist, a similar degree of concurrent effort is required with the dental technician who has to construct the implant with its protruding abutments and the removable superstructure for the artificial teeth.

The indication for a lower intraosseous and subperiosteal implant involves five primary considerations: (1) systemic conditions such as blood dyscrasia, syphilis, diabetes, and hormonal disturbances preclude successful retention of the implant; (2) the patient's previous history and clinical examination determine whether he will be able to tolerate a conventional denture; (3) the patient must be aware of and willing to accept the inconveniences, expenses, and risks involved in the insertion of implant dentures; (4) the patient must be in a healthy condition to be able to endure oral surgery, and (5) the patient's probable life expectancy should be evaluated to determine whether he can be expected to live long enough to enjoy the implant denture.

The implant denture consists of two parts: (1) the implant or fixed part, and (2) the superstructure or removable part.

The denture is designed and constructed of fine meshwork to conform to the normal curvature of the mandible. It is securely fastened to the mandibular bone by screws made of Vitallium. The metal implant becomes a permanent part of the mandible and is covered by strata of mucoperiosteum.

The anterior and posterior abutments extend from the implant and are constructed to receive and retain the removable superstructure.

The artificial teeth then are set into Vitallium bases and incorporated with clasps into a one-piece casting for retention on the abutments. The completed implant denture is almost identical to a removable denture except that it does not rest on tissue.

The advantages of the implant technic for complete lower dentures are as follows: (1) changes in oral condition caused by absorption of soft tissue or bone have no effect on the fit; (2) denture base material is eliminated completely, and, therefore, no bulk can be present; (3) patients are mentally at ease because they know that their lower dentures fit securely and comfortably, and (4) embarrassing situations from a floating or shifting denture cannot arise.

The evidence furnished by a clinical and practical experience of more than seven years is sufficient basis for the conclusion that in lower dentures resting on intraosseous and subperiosteal implants all the attributes of an ideal lower denture can be achieved, such as (1) positive retention; (2) positive stability; (3) positive function; (4) a high degree of esthetics, and (5) a complete lack of bulk. A strict indication, however, is important to a favorable prognosis.

▼ Extractions

The dry socket problem

Leon Majer. *J.Canad.D.A.* 22:598-610 Oct. 1956

Postoperative painful sockets can be largely controlled or almost eliminated if a few preoperative diagnostic factors are considered and if the proper manipulation of tissues is carried out in the extraction of teeth. The removal of teeth is a surgical procedure, and each patient to receive oral surgery should be subjected to clinical and roentgenographic examination of the dental arches and their contents. The examination should include the following: chief complaint, present illness, history, physical condition, clinical examination, coagulation and bleeding time, and roentgenograms. If the findings indicate the need for further examination, the patient is referred to his physician for a complete checkup and any necessary blood chemistry or laboratory tests.

Oral surgery may terminate in a dry socket if the patient suffers from anemia, diabetes, jaundice, or damage to the liver, kidney or heart.

Postoperative painful sockets can be largely avoided if the dentist observes the following rules:

1. Surgery should be performed in a clean, prepared mouth.
2. The teeth are scaled and prepared before applying the forceps.
3. Minimum force is used to remove the tooth from its bony crypt.
4. Undue trauma or the risk of infection is avoided.
5. The mucoperiosteum is dissected sharply to provide for sufficient exposure and to prevent traumatic retraction of soft tissue and the consequent denudement of the bone.
6. All sharp spicules of bone are removed.
7. The formation of a clot in the socket is insured after extraction.
8. Excessive rinsing, and smoking or the use of alcohol immediately after the extraction are avoided.
9. At least one appointment for a postoperative examination is made.

▼ Fractures

Osteosynthesis in fractures of the mandible

(Osvrt na osteosintezu mandibule)

Bogdan Malinger. *Vojnosan.pregl.,Belgrade* 13:212-215 March-April 1956

Treatment of mandibular fractures in which serious displacements have occurred usually consists in setting the bones and repositioning the fragments in as nearly normal a position as possible. This is attempted or effected by surgical intervention under anesthesia.

In many instances, however, satisfactory repositioning cannot be obtained by customary methods. The adjustment of the fractured mandible is effected by a gradual weight extension or traction which stretches the muscles and tends to draw the bones into normal alignment.

In instances in which it seems to be impossible to obtain satisfactory apposition of the mandibular fragments by these methods, osteosynthesis, the surgical fixation of the ends of the bone fragments with sutures, metal rings or plates, is recommended.

Although osteosynthesis was abandoned about 15 years ago because of the danger of complication, recent discoveries in the field of antibiotics, and the introduction of new materials, mainly acrylic resins, have changed the attitude of most oral surgeons toward osteosynthesis.

At the Dental Clinic of the Medical Faculty of the University of Zagreb, Yugoslavia, osteosynthesis has been utilized successfully in the treatment of mandibular fractures in which a mechanical fixation of the fragments was indicated.

Osteosynthesis has proved especially useful in osteoplasty. This method makes it possible to obtain a solid and durable adhesion even when the fragments of the bone have a labile contact.

The advantages of osteosynthesis consist in an easily attainable correct position of the fragments, a quickly achieved consolidation, and a significant shortening of the hospitalization period.

The patient's comfort is greater than when other treatment methods of mandibular fractures are used. The danger of postoperative infection can be reduced by use of antibiotics.

Postoperative intermaxillary fixation by complementary immobilization of the mandible, however, is necessary in the majority of instances in which osteosynthesis is employed.

From 1951 to 1955, osteosynthesis was used at the dental clinic in 24 instances of mandibular fractures, and in 10 instances of osteoplasty. Favorable results were obtained and there were no complications in any of the osteoplasties and in 23 mandibular fractures.

In one instance only an infection developed which required immediate elimination of sequestrums and the wires used in osteosynthesis.

Orthodontics and pedodontics

▼

Growth and development

Morphologic types, hormones and dentofacial anomalies

(Costituzione, ormoni e anomalie dento-faciali)

E. Muzj, G. Maj, C. Luzj, M.A. Braccesi and P. Lucchese. *Riv.ital.stomat.* 11:34-66 Jan. 1956

and

Constitutional basis of orthodontics

Edmondo Muzj and Giorgio Maj. *Angle Orthodont.* 26:213-228 Oct. 1956

Recent investigations on the profile angle in 116 males and 114 females, all normal, and classified from the constitutional viewpoint into longitypes, normotypes and brachytypes, demonstrate that whereas the normotype may have any type of profile, including the extreme types, the longitypes, for the most part, have a strongly angular profile, and the brachytypes have profiles tending toward the rectilinear.

Two thirds of the brachytype group of male subjects had rectilinear profiles, and one third had profiles with medium angularity. Two thirds of the longitype group of male subjects had profiles with maximum angularity and one third had profiles with medium angularity.

Whereas the longilinear individual has, usually, a long, narrow face with a strongly angular profile and an arch with a narrow curve, the brevilinear individual has a low, wide face with a rectilinear profile and an arch with a wide curve.

Previous investigations by the authors demonstrated that in the constitutional type with a rectilinear profile, the plane of the cranial base tends to become horizontal and the vertex of the dental cone tends to raise itself. On the other hand, in the type of individual with an angular profile, the plane of the cranial base attains its maximum obliquity and the vertex of the dental cone tends to lower itself below the level of the nasion. The variability of the different parts composing the craniofacial mass is not casual, but occurs according to determined relationships in the three dimensions of space, necessary in order to realize the architectural equilibrium of the head in the different morphological types of which the profile angle is the resultant and most secure index.

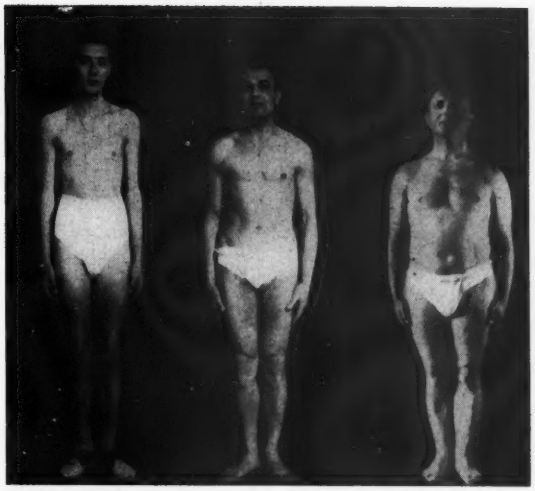
When a frequency polygon is constructed from the values of the profile angle in a large number of subjects taken at random, it will be noted that the (Angle's) Class III patients are all concentrated at that extreme of the frequency polygon corresponding to the maximum value, that is, with an extremely rectilinear profile, whereas the (Angle's) Class II and Class I patients appear at the opposite extreme.

Two hundred boys and girls ranging in age from 5 to 10 years, 100 affected with Class III malocclusion and 100 affected with Class II and Class I malocclusion, were subjected to a double examination—anthropometric and endocrinous. The results demonstrated that in the majority of instances Class III malocclusion is present in subjects belonging to the brevilinear megalosplanchnic group whereas Class II and Class I malocclusions are prevalent in subjects belonging to the opposite constitutional type, that is, the longilinear microsplanchnic.

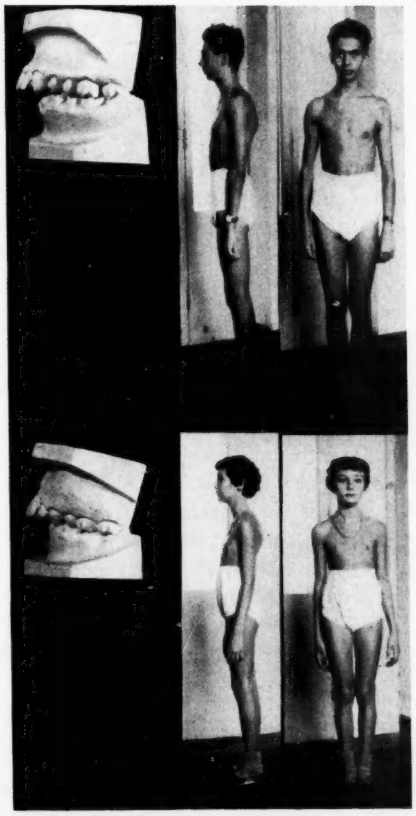
In the same subjects are associated other typical somatic features and particular functional attitudes which are the expression of well-defined endocrine states. Subjects affected with Class III malocclusion are referable, for the most part, to one or the other of two typical varieties of the brevilinear megalosplanchnic type: (1) atonic or flaccid variety, characterized by obesity and hypogenitalism due to a state of anterior hypopituitarism, and (2) sthenic variety, characterized by a vigorous, robust aspect because of the accentuated development of the skeletal system and muscular masses due to hyperfunction of the adrenal cortex, with which is frequently associated hyperactivity of the hypophysis.

Subjects affected with Class II and Class I malocclusions present, on the other hand, with

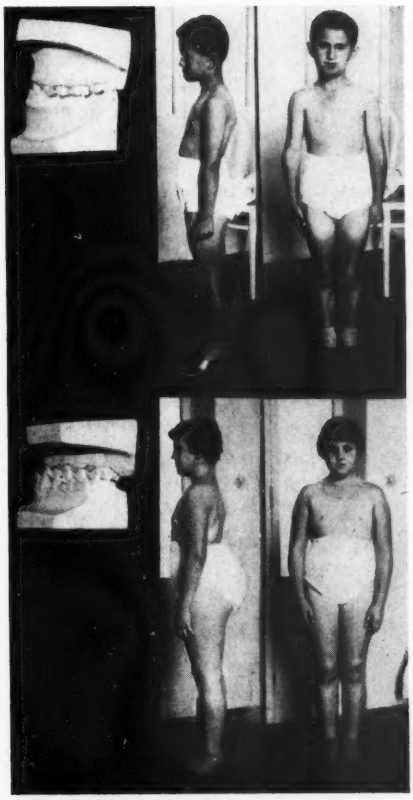
Left: Example of rectilinear profile. Right: Example of angular profile



Three specimens of subjects: longitype, normotype and brachytype, respectively



Two examples of subjects affected by Class I and Class II malocclusion, typically longilinear



Two examples of subjects affected by Class III malocclusion, typically brevilinear (brachytypes)

singular frequency the characteristics of the longilinear microsplanchnic habitus in its asthenic variety, which is characterized by thinness, osteomuscular gracility, curved back, ligamental laxity, and deficient development of the sexual characteristics, due to a state of anterior hypopituitarism.

The determining factor of such dentofacial anomalies is not to be attributed to the major or minor activity of a determined endocrinous constellation, but rather to those elements of a hereditary nature which predetermine the individual ontogenetic plan.

The constitutional type represents the determining element on which depends the normal morphotopographic variability as well as those extranormal variations and disturbances of equilibrium among the various parts of the head, which give rise to the dysgnathias.

The new constitutional view permits a clearer systematic classification of dentofacial anomalies and helps to clarify the etiology, pathogenesis, prognosis and orthodontic therapy.

Developmental growth of the face

(Crecimiento y desarrollo facial)

R.D.Payne. *Rev.Soc.Ortodonc.Tweed* 2:62-71 Jan.-June 1956

A knowledge of the normal developmental growth process of the face is necessary to evaluate in advance the results that may be obtained with orthodontic treatment. As a result of clinical and research work carried out during the last 20 years in the departments of orthodontics of dental faculties in American universities and other American research centers, great progress has been made in the knowledge of how and where the facial bones grow.

Cephalometric roentgenography is the best method for the study of the developmental growth of the face. All the facial bones grow at the same rate during the first seven years of life, but thereafter growth predominates in certain parts of the bone while it is insignificant in others.

In the anteroposterior growth of the face, the sites where growth is most active for the maxillary bones are the frontomaxillary, zygomaticomaxillary, zygomaticotemporal and pterygopalatine sutures. The growth of the maxillary bones takes place by bone apposition as well as by endostosis on the maxillary tuberosity and on the transverse palatine suture with closure of this suture.

Vertical growth of the face in the maxillary region is increased by the development of the alveolar crest which continues to grow until the person reaches 15 or 18 years of age. Lateral growth of the maxillary bones is the result of growth of bone in the pterygopalatine suture. The mandible grows anteroposteriorly and vertically from deposition of the bone at the head of the condyloid process and from apposition of bone which takes place on the posterior border of the ramus.

The condyle is the coordinator of the whole process of developmental growth of the face. Proportional growth of all the facial bones is determined by the rate of growth of the head of the condyloid process, which can vary. The facial growth pattern is essentially constant for every individual because the mandibular condyle grows in such a way as to maintain a constant relationship between all the parts of the face.

The patterns of facial growth are basically the same for men and women, although women may reach complete facial growth earlier than men. Men acquire additional apposition of facial bone at puberty. The additional bone changes the aspect of the facial skeleton but the basic structural pattern of the bones remains unchanged.

Studies on the capacity of the oral cavity of school children, especially on its relation to the bizygomatic breadth, angle breadth, nasomental length and lower facial height

Hiroshi Tochihara. *Shikwa Gakuho* 56:1-7 Sept. 1956

The capacity of the oral cavity (as determined by the maximum quantity of water it could contain), bizygomatic breadth, nasomental length and lower facial height were measured in 1,024 school children (484 boys and 540 girls) in the Kumamoto prefecture, with the following results:

1. The capacity of the oral cavity increased regularly by from 3 cc. to 5 cc. each year.

2. The difference between the maximum and minimum capacity was about 40 cc.

3. Boys have a larger capacity of the oral cavity than do girls.

4. The bizygomatic breadth, the angle breadth, the nasomental length and the lower facial height increase in direct proportion to the capacity of the oral cavity.

5. The vertical length increases until 12 years of age, and the horizontal length decreases after 12 years of age.

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Orthodontics

Arch width in the premolar [first bicuspid] region—still the major problem in orthodontics

Ashley E. Howes. *Am.J.Orthodont.* 43:5-31 Jan. 1957

Inasmuch as the facial skeletal profile pattern has achieved such wide use as a means of study and as a diagnostic aid in orthodontics, it was decided to investigate its range of variation in instances of malocclusion, and to determine whether there are any correlations between the profile pattern and arch dimensions. The records of 232 patients were tabulated, and the extremes and means of 26 factors were noted, resulting in the following conclusions:

1. A high percentage of persons with irregular or crowded teeth have a greater-than-average amount of tooth material.

2. A still higher percentage of such persons have less-than-average width in the first bicuspid region.

3. Nearly all persons with crowded teeth have insufficient arch width in the first bicuspid region in proportion to their tooth material.

4. Nine out of ten persons with malocclusion have abnormal balance of the musculature which surrounds the dentition, producing procumbency of the anterior teeth and possibly influencing the arch width in the first bicuspid region.

5. By taking advantage of additional anteroposterior growth through the use of an extraoral retractive force, the orthodontist can move the teeth distally or hold them back while forward growth occurs. In either instance, additional basal arch width is afforded to support the teeth.

6. An increase in arch width is more feasible when treatment is started in the deciduous or mixed dentition and continued through the period in which the first bicuspids erupt.

7. There appears to be some correlation between arch width and length and the mandibular plane angle, those persons with steep planes generally having narrower and shorter arches. This correlation may be only coincidental, with other skeletal factors often associated with the steep mandibular plane being of greater importance than the mandibular plane itself in producing narrower, foreshortened arches.

8. Sound orthodontic judgment of the immeasurable factors involved in malocclusion remains the prime requisite in making decisions as to whether to attempt arch enlargement or to reduce the amount of tooth material by extraction.

Changes of sensibility of permanent teeth during orthodontic treatment

(Sensibilitetsrubbningar i samband med ortodontisk behandling)

Nils-Ake Nordh. *Odont.Revy* 7:43-52 Jan.-March 1956

Changes of sensibility in permanent teeth during orthodontic treatment were measured at the George Eastman Institute in Stockholm, Sweden.

At different stages of orthodontic treatment, serial tests were carried out with 32 patients and 486 teeth. In these tests, Björn's electrical stimulator was used.

During the orthodontic treatment, 35 teeth were extracted.

The insertion of orthodontic appliances and of elastic rubber bands did not change significantly the pain threshold value. Extraction of isolated teeth, however, decreased considerably the sen-

sitivity of teeth adjacent to the site of extraction. A significant difference, at a 5 per cent level of the pain threshold value, occurred after tooth extraction. Five adjacent teeth became completely insensitive to the maximum current of the stimulator.

In seven instances, tooth movement obtained by orthodontic treatment had an unfavorable effect on the pain threshold value of the involved teeth. The maximum current strength produced no effect. These changes, however, were not permanent.

These changes of sensibility in permanent teeth should be considered in orthodontic treatment planning. Natural forces active in these instances can be used for a planned and methodical treatment method.

The orthodontist, however, must be aware of the relations existing between changes of sensibility in permanent teeth and orthodontic treatment, so that he can evaluate and utilize them.

▼ Pedodontics

Silver nitrate treatment of proximal caries in primary molars

Solveg Schultz-Haudt, Richard Taylor and Finn Brudevold. *J.Den.Children* 23, Part I:184-186 Sept. 1956

A reliable and rapid method of treating proximal caries in deciduous molars which are approaching exfoliation is needed. The short life expectancy of such teeth hardly justifies a therapy which involves time-consuming and expensive restorations.

It was felt that silver nitrate might be effective when applied to cavities which were made self-cleansing. Only a moderate caries-inhibiting effect might be sufficient to prevent further spread of the carious process, since the diminished tendency for food accumulation would work toward the same end. This possibility was subjected to clinical trial.

In 167 deciduous molars with proximal caries, the carious material was removed. The cavity margins were disked smooth and made to slope toward the occlusal surface so that the interproximal space was rendered self-cleansing. The cavities were treated with silver nitrate. To serve as controls, 118 deciduous molars in the same children were given similar mechanical treatment, but in these instances there was no application of silver nitrate.

After one year, 111 of the 167 teeth treated with silver nitrate had arrested caries, compared with only 16 teeth in the controls.

It was concluded that removal of caries and slicing followed by the application of silver nitrate is a suitable treatment for deciduous molars approaching exfoliation.

Pedodontic patient management

Charles A. Sweet, Jr. *J.California D.A. & Nevada D.Soc.* 32:358-363 Sept.-Oct. 1956

The most successful dentists for children find no time for play. They are genial, businesslike and begin work as soon after the patient arrives as practicable. These operators have time for a friendly greeting in the operating room. For a minute or two before actual operative procedures begin, they find time to converse about things of general interest to the child. The dentist should appear friendly and courteous but should not overplay this aspect. In a methodical way he explains to the child what he wishes and what he expects to do, with no opportunity for the patient's acceptance or rejection.

Before the child's first visit, the dentist should send a sheet of "Suggestions for Parents" to the parents. This eliminates work and emotional problems.

When the parent remains in the reception room while operative procedures are in progress, most management problems are eliminated. The child will place his trust and confidence in the dentist because there is no parent to turn to.

A receptionist with a pleasant smile, who takes time to say "good morning" and really means it, helps create a favorable environment. So does a reception room with some interest for the child—

a tropical fish aquarium, a corner with small chairs, table and books.

When the dentist invites the child into the operating room, he should greet the child with a friendly "Hello, Bill." The dentist should ask the child firmly and quietly to seat himself in the operating chair. The child should not be helped into the chair unless he cannot climb into it unaided. The child should be treated in a firm, friendly manner. The dentist should fit the child into the behavior and work pattern of the dentist.

Sedation should be used on all children who may create a management problem, on handicapped children, and by dentists who are inexperienced. Sedation reduces physical resistance and psychic shock, relaxes the child, and increases the effectiveness of any procaine hydrochloride used.

The dentist should give the impression when operating that he is in absolute control of everything he intends to do. Firmness, friendliness and truthfulness are the keys to the management of children.

Etiology and treatment of speech impediment in childhood

(Zur Ätiologie und Therapie
des Stotterns im Kindesalter)

E. Geisler. *Arch.Kinderhk.,Stuttgart* 152:11-30 Jan. 1956

Of the three social faculties, speaking, reading and writing, speech stands apart as the master instrument with which man controls his social environment. No two persons possess the same speech pattern.

The organs man uses for speech are primarily designed for other purposes. The lungs are used for respiration and only secondarily for providing the proper breathing for speech. The larynx is a valve protecting the respiratory tract and is not the producer of sound. All units of the articulatory system, the tongue, lips, jaws, teeth and palate, are designed for chewing, sucking and swallowing functions, and only secondarily for articulatory purposes. Man uses these organs for speech function. To accomplish this, he needs a complicated, well-functioning nervous system. The main prerequisite for good speech, therefore, is an adequate nervous system.

Speech handicaps may be grouped into the following two categories: (1) those requiring medical or dental (orthodontic or prosthetic) treatment, and (2) those requiring educational (phoniatric) treatment.

Articulate speech is the result of single or combined vocal sounds. The sounds may be continuous or interrupted and may vary in volume, intensity and pitch.

The usual causes of speech defects are as follows: (1) incorrect imitation of sounds by the child; (2) retarded physical and psychic maturation; (3) edentulousness; (4) oral deformities and (5) hearing deficiencies.

During 1955, 40 children affected with stammering or stuttering were examined at the Pediatric Clinic of the University of Stuttgart, Germany.

It was established that the speech impediments (asynergy of the articulatory musculature) were caused mainly by improper functional habits of the organism. These defects were not the result of an isolated, traumatic or pathologic discontinuity of speech function, but rather of a defective coordination of the cortical and subcortical functions.

Although physiologic factors frequently bring an existing or pre-existing speech defect to the surface, somatic loss of function can also be responsible for the occurrence of the speech impediment.

Because it seems impossible to influence either the functional habits or the pathophysiologic disturbances of speech caused by exogenic factors, speech treatment must be concentrated on the psychologic factors through adequate phoniatric therapy, breathing exercises, psychotherapy and correction of malposed or rotating teeth, replacement of missing teeth, repair of malformed jaws and malrelation between the jaws, and proper spacing between the teeth.

Stammering and stuttering are true diseases, even in the medicolegal sense.

Professional activities

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Education

The University of Tennessee College of Dentistry

James T. Ginn. *Bul.Alabama D.A.* 41:24-26 Jan. 1957

The University of Tennessee College of Dentistry is the oldest dental school in the South; it has been in continuous operation since it was founded in 1878 in Nashville. In 1911 the college was moved to Memphis to secure larger facilities for clinical work.

The University of Memphis College of Dental Surgery was founded in Memphis in 1910. In 1911 that college transferred to the board of trustees of the University of Tennessee all its facilities and good will. The faculties, students and equipment of the two institutions were merged.

The present building housing the College of Dentistry was completed in 1949. It is in the heart of the medical center. The five-story dental building has about 75,000 square feet of floor space. A surgery clinic, technical laboratories, lecture rooms and maintenance equipment are located on the first floor. On the second floor are faculty offices, registration desk, waiting room, chemicopathological laboratory, surgery, therapeutics, roentgenology, examination and treatment planning clinics. The operative dentistry and pedodontic clinics, offices and a supply desk are on the third floor. On the fourth floor are the crown and bridge and prosthetic clinics, offices, student locker rooms and technical laboratories. Graduate orthodontics, postgraduate pedodontics, dental hygiene facilities, lecture rooms and offices are on the fifth floor.

The School of Biological Sciences provides instruction in the basic sciences to all students in the medical units—dental, medical, pharmacological, nursing, dental hygiene, graduate and postgraduate students and others.

The supply of clinical material is adequate to meet the need for student clinical practice experience. In 1955 more than 12,000 patients received dental services in the clinics of the school and hospitals.

The College of Dentistry operates on the Tennessee four quarter plan. Freshman dental students are admitted in four classes of equal size during each calendar year, at quarterly intervals; each course in the curriculum is given each quarter of the calendar year. Entering classes are limited to 35 students each quarter. Applicants who are residents of the State of Tennessee and meet the admission requirements of the col-

lege receive preferential consideration. The college is able to accommodate a reasonable number of students from neighboring states. Through the four quarter plan a student is able to complete the dental curriculum in three calendar years.

Students taking the two year certificate program in dental hygiene are admitted in September each year with a class of 32. The College of Dentistry presents both postgraduate and graduate programs. Postgraduate courses vary in length from refresher courses of two days to more extensive courses of nine months. The graduate program in orthodontics requires a minimum of two years of study and clinical practice.

▼ Miscellaneous

About your eyes and dentistry

Jerome B. Conlogue. *D.Asst.* 25:17-19 Sept.-Oct. 1956.

The eyes of a dentist and of a dental assistant, during office hours, are never truly at rest, for the eye is only at rest when viewing objects at 20 feet or more. The basic visual problem of the dentist is accommodation (focusing) for short distances. The dentist must also cope with excessive demands on convergence. He must focus each eye for clear vision, and the two eyes must turn inward, fixating on the work in order to maintain single binocular vision.

The average working distance for a dentist is about 13 inches. This distance requires three powers of focusing for clear vision; and, to perform duties comfortably and efficiently at this distance, about three powers of focusing must be held in reserve.

Whereas the average person makes 35,000 visual fixations a day, the dentist probably makes about 100,000.

The eyes need no help or only the assistance of regular spectacle correction until the onset of presbyopia (farsightedness) which usually occurs shortly after a person reaches the age of 40. Then a pair of near point glasses (reading glasses) or bifocals will bring the dentist's vision to 20/20 or to 100 per cent visual acuity for the critical working ranges of 20 to 54 inches. After 50 years of age, however, the average dentist who wears only bifocals suffers a loss of vision in the vital range of 20 to 54 inches; frequently, to see things clearly at arm's length or a little farther, his chin will go up and he will hunch a little closer to the object under inspection. This action, done hundreds of times a day, fatigues the eyes and causes general tiredness.

The problem can be solved with a continuous vision lens or trifocal. The trifocal has a third segment placed just above the bifocal area which restores clear comfortable vision in the intermediate working area. The trifocal segments can be placed so that the dentist can see instruments on the tray, nearby shelf, table or cabinet without moving his head in an awkward position.

The dentist, like other professional people, is generally careless about his eyes. He will spend thousands of dollars on office equipment and instruments to serve his patients and will neglect his eyes and struggle along with inadequate vision. No profession requires keener eyesight or is more demanding visually than dentistry.

Plans for establishing social dentistry

(Ensayos sobre odontologia social)

F. Estevez. *Venezuela odont.* 20:25-31 April 1956

In Venezuela, plans have been suggested with a double purpose: (1) to offer proper dental care to working people with small salaries and their families and (2) to prevent intrusion of the layman in dental practice. It is common in Venezuela to find laymen practicing dentistry who have neither the professional preparation nor the right to practice.

The plans suggested would establish in Venezuela private cooperative dental centers with minimal fees. Professional services would be given only to working people who cannot afford the fees charged at the present time. If the plans are accepted by the dental profession and the Colegio de Odontólogos de Venezuela, the cooperative dental centers will be established in the north, south, west and east sides of large cities,

namely of all the cities with a large population in which a sufficient number of dentists are practicing.

Only persons with a monthly salary of no more than 600 bolivars, and their families, would be allowed to register at the centers and receive the benefits of the cooperative plans. The program, together with the equipment and buildings to be appropriated for the dental centers, would be financed by the government through negotiations with the Colegio de Odontólogos de Venezuela. The equipment would be modern but not expensive or extravagant. It would include x-ray apparatus. Furnishing the centers and some of the instruments will cost about 7,000 bolivars, to be raised from donations or contributions of the members of the cooperative organization.

Once the dental center is established, it will function as a cooperative organization, open to the public five days a week. The work will be in charge of six dentists in each center: two for exodontics, two for oral surgery, and two for prosthetics. Every one of the members will give one day of service a week; this fact makes it necessary to provide each center with 30 dentists every week.

The fees of dentists at present in Venezuela for certain types of work are as follows: extraction of a tooth, between 20 and 50 (in rare instances, 10) bolivars; porcelain and amalgam fillings, between 20 and 50 bolivars; complete dentures, between 400 and 2,000 bolivars. The fees at the cooperative dental centers would be as follows: extraction, between 4 and 5 bolivars; roentgenograms, 4 bolivars for the first and 2 for each additional one; fillings with porcelain and amalgam, 10 and 20 bolivars, respectively; gold inlays, 30 bolivars each; complete dentures, 250 bolivars for a set; partial prostheses, the price paid to the laboratory and a fee in the same amount to the center.

The Colegio de Odontólogos de Venezuela would send circular letters to all dentists who practice in territories that will have cooperative dental centers, asking them to send to the centers people in need of dental work who are unable to pay the regular fees. Advertisements would be published in the local papers inviting the people who meet the requirements of the centers—namely, those in need of dental work and families whose head has a monthly salary of less than 600 bolivars—to come to the centers. Free social aid dental dispensaries, such as the Padre Machado, the Adventista, the Juventud Católica Venezolana and the Padre Alfonso Vaz dispensaries, would also be asked to send patients who fit the requirements of the program, because in these dispensaries only exodontic work is performed.

The head of the family would have to show the stub of his salary check to prove his income. Then he and his family would be eligible to participate in the program. The patient would be informed of the price before the work is begun. He would have to decide how much he can afford to pay before the work is undertaken. The patient or the head of the family would pay a small amount as an initial payment when the work was begun and would pay the rest in installments of 10 to 15 bolivars each week until he had paid the entire sum.

The program would be of great benefit to the working people and, at the same time, would prevent laymen intruders from practicing dentistry, because they would not be able to compete with the fees of the dental profession.

Some phases of the practice of dentistry (Aspectos del ejercicio de la odontoestomatologia)

Jose Morales Cepero. *Rev.espan.estomat.* 4:249-253 May-June 1956

Today's tendency is to develop capable technicians, not only by adequate intellectual preparation but also by the elimination or renovation of old and inefficient professional habits. In dentistry this means the dropping of outmoded technics and the adoption of new habits adapted to present-day clinical needs and therapeutics.

Thus viewed, the art of prescribing calls for some brief comments.

It is not sufficient that dental restorations be performed accurately and correctly. The dentist is working on a human being, a constellation of many diseases and disorders, which are capable of being improved by a judicious use of drugs. Manual work can be incomplete if these systemic problems remain unsolved.

The nervous patient, the one with an unbalanced sympathetic nervous system, the one with a blood dyscrasia, can be improved by adequate medication. Dental treatment can fail if vitamin disorders go unrecognized and untreated. Antibiotics, sulfonamides and vaccines must be understood in their indications and dosages. Likewise analgesics, antisialagogues, dentifrices, tonics, calcium preparations and others.

The dentist should give a written prescription to his patient, even for simple and usual drugs. He thus increases his own status by placing his profession on a medical level, and eliminates the possibility of the patient's self-medication which may be as dangerous as that prescribed by lay friends.

To prescribe correctly the dentist must keep himself well informed through books, journals and lectures, both dental and medical, and the daily use of the knowledge he acquires.

Sculpture—an avocation for the dentist

(Bildende Kunst—Ausgleichstätigkeit des Zahnarztes)

Gerhard Focke. *Zahnärztl.Praxis* 7:12 Aug. 15, 1956

The value of a sculptural work lies in the representation of observed or mentally visualized objects in solid material and in three dimensions. Sculpture is an almost perfect avocation for the dentist who is searching for a mental and manual diversion from the wearisome daily routine in his professional work. Many dentists, however, who have taken up sculpture have been discouraged because they felt that lack of time, will, training and talent prevented them from becoming more than amateurs. In art and science, outsiders often contribute new ideas and forms without which the work of professionals would be less prolific.

The activity of a dentist in his daily work is to treat and cure diseases of the teeth, to construct and insert artificial dentures, and to perform oral surgery. His patients, therefore, cannot be considered as healthy persons, and some of them are mentally unbalanced because of pain and suffering, anxiety and apprehension. Dental treatment is accompanied by the patient's need for understanding, sympathy, concern, explanation, reassurance and comforting. The relationship between dentist and patient should be based on confidence and trust. The dentist must possess poise and self-assurance to be able to gain acceptance for his suggestions to the patient. He often must influence the mind of strangers, and there is nothing more strenuous than this.

These mental and physical powers, however, are not inexhaustible. Long hours of physical and mental work produce a high degree of fatigue. New energy must be supplied from time to time. Periodic vacations, relaxation and a suitable avocation can provide this energy.

Sculpture is the art of form, and modeling the part concerned with treatment and manipulation of the surface of form. It is the building up and shaping of a sculptural work in plastic material preparatory to casting in plaster, bronze, terra cotta or porcelain, or cutting in wood or stone. The principles of the modeling technic in sculpture are known to dentists because similar technics are used in modeling and casting crowns, bridges, inlays and dentures. Also the methods used in drawing and designing and in material selection are almost identical. Even most of the sculptor's tools resemble dental instruments.

The transfer of an object in drawing or in the three-dimensional form of a piece of sculpture trains the eye in establishing the correct proportion of bodies, angles and lines—a knowledge and training which certainly is useful in dental practice.

Questions and answers about the D.C. Dental Society's major medical expense insurance plan

Charles F. Suter. *J.Dist.Columbia D.Soc.* 31:2-5, 14-15 May 1956

Twenty-four questions relating to a major medical expense insurance plan available to members of the District of Columbia Dental Society are answered. The plan provides protection against "catastrophic" medical expenses not covered by most hospitalization policies. A maximum benefit of $5,000 for each unrelated illness or injury is provided. Coverage may be obtained for the den-

tist alone, or for himself and all eligible dependents. A feature of the plan is that benefits are payable for practically any medical expense prescribed by the physician, regardless of whether the patient is at home or in the hospital.

The policy does not cover the initial costs of an illness or injury; presumably these will be covered by the regular hospitalization policy. As soon as a person's medical expenses exceed the deductible amount (usually, about $500), the major medical expense insurance policy starts paying benefits. It pays 75 per cent of the medical expenses in excess of the deductible amount. The policy covers medical expenses incurred for practically all treatment, services and supplies which a legally licensed physician or osteopath prescribes. Hospital confinement, however, must be in a legally constituted hospital and there is a $15 per day maximum payment for the hospital's charge for room and board in a private room. Nursing care must be rendered by a registered graduate nurse.

If the patient is still sick or injured at the end of a two year period, he may again start accumulating medical expenses to equal the deductible amount, after which benefits will begin again until the maximum benefit of $5,000 has been used up.

The policy covers only in the United States and Canada. Physical examinations are not required.

Recruitment to the dental profession: committee suggests remedies for shortage

Brit.M.J. No. 4997:153 Oct. 13, 1956

The Committee on Recruitment to the Dental Profession, appointed in 1955, has made its report. The profession in Great Britain is failing to attract recruits for three main reasons: (1) the public does not understand the import of dental health and too little is known of the possibilities of dentistry as a career; (2) many dentists are unwilling to advocate it, and (3) parents cannot afford the outlay for training for a profession which is not as attractive as it could be.

If appropriate steps are taken to remedy these things, young people will offer themselves in sufficient numbers as recruits. To achieve the aim of increasing the register to 20,000 names, an annual intake of about 900 is needed, compared with about 550 at present. The accommodations in dental schools must be increased. The possibility of developing the facilities of dental departments in general hospitals for clinical training should be considered. A new dental school or schools to accommodate 200 students a year should be established. The foundation of a dental school in the University of Wales for an intake of 50 students annually should be expedited.

So far as possible, the causes of dentists' present discontent should be removed. The whole system of remuneration should be reviewed, and consideration given to correcting the present pattern of earnings whereby professional income tends to diminish in middle age, regardless of increasing experience.

Methods should be examined whereby help can be made available to suitable candidates for dental schools when the parents cannot pay the tuition.

The number of consultant posts open to dentists should be increased, the committee says, as should facilities for research and original work.

Oral diagnosis

E. Cheraskin. *VA Program Guide.* G-3 M-4:1-6 June 20, 1956

Diagnosis is the art or the act of distinguishing one disease process from another. The phrase "differential diagnosis" is redundant because the element of differentiation is implicit in the term "diagnosis." Oral diagnosis is a technic; it is that phase of the dental sciences which treats of the nonmanual, the nontechnical aspects. Oral diagnosis is to oral medicine as physical diagnosis is to internal medicine.

A satisfactory oral diagnostic method must be orderly, practical and comprehensive.

One method of oral diagnosis that has been used successfully for a number of years embraces the following three phases: (1) gross appraisal of the patient, including his stature, gait, speech, age, sex, history, personality, temperature, blood pressure and pulse; (2) examination of the head

and neck, including the size and shape of the head, any facial swelling and asymmetry, temporomandibular joint, inspection of the eyes, ears, nose and paranasal sinuses, and palpation of the neck, and (3) examination of the oral cavity, including an appraisal of the breath, and of the lips, buccal mucosa, saliva, gingiva, tongue, sublingual space, palate, pharynx, tonsils and the teeth. By this method the dentist is supplied with all of the possible extraoral clues as well as the clues that would normally be present in the oral cavity.

Each time a clue is recorded, the question must be asked, "Is one dealing with an infectious disorder, a disturbance of a physical nature, a chemical problem, a hormonal imbalance, a developmental or nutritional disturbance, one of several metabolic disorders, is the lesion neoplastic or cystic?" Each clue must be categorized in one of the groups just listed.

A practical method of recording the data should be used. A well-trained diagnostician will find a blank sheet of paper sufficient; the undergraduate student or the poorly-trained examiner will require an exhaustive form on which each step in the diagnostic procedure is listed.

▼ History

Dental antiquities: the first dental x-ray machine

M.B. Varnado. *J.Louisiana D.Soc.* 14:10-12 Fall 1956

On November 8, 1895, Professor Wilhelm Konrad Röntgen, working in his laboratory at the University of Wurzburg, Germany, suddenly noticed a strange light shimmering from a tube with which he was experimenting. He found that the rays penetrated wood, books and thin sheets of metal. He placed his hand in the line of the rays, and plainly pictured on a screen were the bones of his hand surrounded by the flesh. His wife placed her hand on a photographic plate in line with the rays; on the plate when developed were clearly pictured the bones of her hand within the living tissues, and two rings on her finger.

News of this epoch-making discovery was flashed to the world. So universal was the interest in this weird and magic light that there was not a member of the dental profession anywhere who did not learn about it immediately.

C. Edmund Kells, born on Canal Street in New Orleans and practicing dentistry within a stone's throw of his birthplace, was thrilled at news of Röntgen's discovery and at once envisioned the vast possibilities of the discovery to dentistry. Kells cabled to Europe for a tube and other equipment, and began assembling an x-ray unit for dental experiments.

The first unit was installed by Kells in the attic of his home. It was there that his experiments resulted in the first dental roentgenogram ever taken. His film consisted of small squares cut from ordinary glass photographic plates and wrapped in black baseplate dental rubber to protect them from light. The exposure time was from five to ten minutes. The glass "film" was held in position against the teeth by clamps and trays formed from aluminum, modeling compound and other material from the dental office.

The preparation for this first dental roentgenogram required an enormous amount of time, thought and perseverance. When all was in readiness, the room was a maze of wires and paraphernalia. The tube was a small, exposed Crookes's tube held with a wooden clamp. The developing unit was crude. Exposure, developing, fixing and washing required some hours. The first dental roentgenogram was made in the early spring of 1896.

Tulane University has in the Kells Museum a collection of models, inventions, photographs, notes and writings.

Prosthetic dentistry

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Partial dentures

Artificial dentures for children

(Protezy dzieciece wlasnego pomyslu)

Edward Kowalski. *Czas.stomat.* 9:39-45 Jan. 1956

In dental practice, especially during periodic examination, children with missing teeth are often observed before orthodontic therapy or prosthetic restoration has been attempted. In most instances, such a loss of teeth has not been caused by accidental blows but has occurred as a result of dental caries.

Children deprived of their normal facial appearance by missing teeth, especially anterior teeth, may undergo unfavorable psychic and physical changes. Disturbances in the function and the normal development of the jaws caused by loss of several deciduous teeth may result in facial distortion and abnormalities in both jaws, speech defects or in mental trauma.

It is important to preserve the deciduous teeth to the period of the physiologic change to the permanent dentition, and to maintain the proper position of the permanent teeth.

When several teeth are missing in the deciduous or permanent dentition in child patients, it is advisable to replace the missing teeth with partial dentures. The normal development of the jaws, however, is of primary importance, and the main requirement for partial dentures inserted in the mouths of child patients is that they permit an undisturbed normal growth of the jaws.

The purposes of these specially designed dentures for child patients are as follows: (1) restoration of normal mastication; (2) correction of the bite; (3) space maintenance and prevention of tooth displacement; (4) prevention of malocclusion; (5) stimulation of normal eruption of the permanent teeth, and (6) esthetic replacement for teeth lost.

Inserted dentures are less noticeable if the artificial teeth are placed in the identical positions and inclinations of the natural teeth, if the contour and position of the dental arches remain unchanged and if the size and shape of the teeth are unaltered.

Either acrylic resin or metal dentures can be used successfully in child patients.

Acrylic dentures for the upper jaw should be composed of the basic foundation and four movable components. The foundation, situated in the center, should contain four pairs of stainless steel tubes, placed at appropriate intervals. A loop-shaped stainless steel wire, 0.7 mm. in diameter, is inserted into the tubes. The free end of the arm of the loop then is attached to the movable part. The length of this arm should always be greater than the thickness of the foundation, permitting free movements of the four movable parts.

Dentures with a metal foundation should also be composed of five parts: the metal (stainless steel is preferred) foundation and the four movable parts which can be made of either metal or acrylic resin. The horseshoe-shaped metal foundation contains four grooves in which slides of stainless steel are fixed to permit free movement of the movable parts.

The denture with a metal foundation for the mandible also is composed of five parts. Slides of stainless steel are fixed at suitable distances in the foundation and are connected with the movable parts. The grooves should be longer than the width of the slides to permit forward, backward and lateral movements of the adjustable parts.

The acrylic and the metal dentures for the lower jaw usually contain four movable components. In some instances, however, either additional parts or a smaller number will be required. If necessary, the movable parts can be attached to the teeth by clasps.

After wearing these dentures for a short time, children have no difficulty during mastication or speech function.

Figure 1 Acrylic upper denture. Left: Occlusal view; Right: Palatal view

Figure 2 Acrylic lower denture. Left: Occlusal view; Right: Five parts of denture

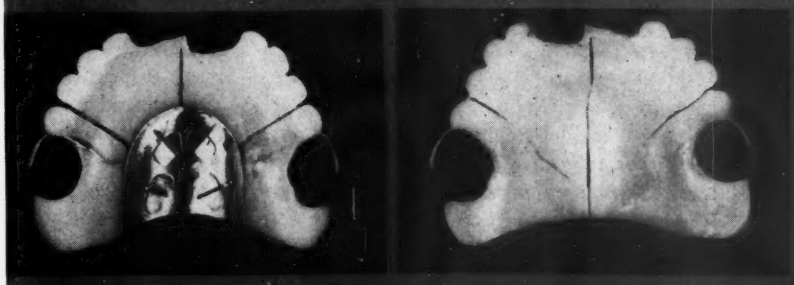

Figure 3 Stainless steel upper denture. Left: Occlusal view; Right: Palatal view

Figure 4 Stainless steel lower denture

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Crown and bridge

Impressions of rubber impression material and casts electrolytically covered with copper for inlays (Impresiones a base de material de caucho y moldes electrolíticamente cubiertos con cobre para incrustaciones)

J. Asturias. *Rev.Fed.odont. Colombiana* 7:296-307 May-June 1956

Impressions prepared with rubber impression material can be used (1) for individual inlays, with the indirect method, (by taking the impression in a copper band) and (2) for individual or multiple inlays or bridges (by taking the impression in an especially prepared tray). In both instances the impressions are rendered electroconductive and then subjected to copper electrolysis for preparation of the casts. The technic of taking the impressions and making them electroconductive for the application of copper electrolysis consists of several steps.

Prior to taking the impressions, the inner surfaces of the copper band or of the tray are roughened with a carborundum stone and with a large bur, respectively. The material to be used is mixed with the catalyst and used in thin layers for cavities and thick layers for impressions. It is applied to a cavity with a syringe or other instrument. For impressions that are taken in copper bands, impression paste is put on the occlusal end of the band. The bands, having been charged with the material, should go on the tooth without pressure and without touching the occlusal surface of the tooth. The impression is taken and kept in place by the dentist's finger until the material settles completely, after which the impression is removed, washed with water at room temperature and dried with compressed air.

Impressions that are taken in a tray involve the preliminary making of alginate impressions and of a chalkstone model upon which a tray of self-curing acrylic resin is made and filled with the rubber material. After the material has completely settled, the impression is removed and handled in the same way as the impression made in bands.

Impressions taken in copper bands are mounted on a platform in order to render them electroconductive. A copper wire is twisted around the impression in the band and covered with caliber 30 wax at room temperature. The border of the impression which is occupied by the impression paste is left uncovered. The impression is painted with adhesive liquid, Staco, and left to dry for two minutes, after which a 97 per cent or 98 per cent pure graphite solution is applied to the impression with a brush.

Impressions taken in a tray are prepared for electroconduction by joining a copper wire with impression paste to the lingual border of the acrylic tray and introducing the wire with pincers through the occlusal surfaces, paralleling the long axis of the tooth. The wire should be thin, and it should not form any angle. The adhesive liquid and the graphite are applied to the individual tooth or the various teeth to be copper electrolyzed as well as to the holes made in the impression by the wires. The regions of the impressions which should not be copper electrolyzed are isolated by covering them with a narrow strip of tin. At the end of the process the impressions are washed with water at room temperature and dried with compressed air. Copper electrolysis is obtained by using any of the common machines designed for this purpose.

Another method consists in placing the impressions in a bath of copper sulfate with an anode in a cloth bag. The end of a rubber hose which is connected to an air compressor is submerged into the bath and placed between the anode and the impressions, and the air current is started. The pressure of the air current should be sufficiently strong so as not to spill the bath solution. The author obtained the best results in copper electrolyzing a molar of medium size with an air current of 50 milliamperes applied for 15 minutes followed by one of 100 milliamperes for the entire night.

The best method for copper electrolyzing impressions made with rubber material consists in rendering the impressions electroconductive by

applying to them an adhesive liquid and painting them with crystalline graphite and by agitating the electrolytic fluid with compressed air during electrolysis. The rubber material lends itself to various technics, among them application with a syringe.

▼ Complete dentures

Prosthetics for the masses

A. Russell. *New Zealand D. J.* 52:120-126 July 1956

The demand for artificial dentures is extensive and there is no evidence that it will decrease in the near future. Among the mass of the people there is no stigma attached to the wearing of artificial teeth. Their attitude is not "Are those your natural teeth?" but "What beautiful teeth! Where did you get them?" Artificial teeth are candidly appraised as such. A large body of people want what could be termed the "Ford" denture, whereas the dental profession as a whole is interested in the "Rolls Royce" denture. This is one reason why there is so much illegal practice.

The general tempo of living has increased greatly in the last half century; the time factor is important in dentistry. Dentures of lesser but not inferior quality should be accepted by the profession in the same way that fillings of a lesser quality than gold are accepted.

Many time-wasting technics can be abolished. The use of the wash or veneer impression technic cannot be justified on clinical results. There is only one routine impression material for complete dentures—plaster of paris. The use of gum tragacanth on the blocks and wax models saves valuable time and engenders a feeling of confidence in the patient. Few dentures made in New Zealand are anatomically articulated. The diet of the people is so soft that efficient mastication is not required.

With a staff of two nurses and five technicians, and with two chairs available, a graduate of some five or six years' standing should average ten dentures a day. This means seeing between 42 and 50 people in a seven to a seven and a half hour day. These figures are calculated on a basis of seven patients: three upper and lower dentures and four single dentures, with attendance for impression, bite, try, finish, examination and easing. A good technician should work at the rate of two dentures a day.

Standard trays of the Cascodent or Anatoform type are sufficient. Considerable care in placing the center line must be exercised in taking an impression of the bite. The upper wax denture should be stuck firmly in place. At the final appointment all dentures should be checked for sharp edges, bubbles, too heavy post-damming, and overextended lower buccal flanges. Acrylic dentures made from plaster impressions often require easing in the following regions: uppers, distally and buccally in the tuberosity region and at the labial frenum; lowers, lingually in the bicuspid region. The finished dentures should be seated with gum tragacanth.

The aim of the dentist must be to gain the confidence of the patient and keep it. Nothing gains a patient's confidence more than skilled easing. The ability to render a denture comfortable in a matter of moments quite rightly is regarded as evidence of a high degree of skill.

Dentists do not take sufficient pride in prosthetics.

Mucosal irritation associated with directly opposed metal inserts

Jerome B. Casey. *New York J. Den.* 26:305-306 Oct. 1956

Metal inserts in plastic blocks, when used in place of plastic or porcelain posterior teeth in complete dentures, may irritate the tongue or cheek.

A 61 year old retired Navy officer, with heavy jowls, appeared for adjustment of his dentures, which had metal inserts in plastic blocks in both the upper and lower posterior regions. The lower denture had a gold base with a flange which stopped short of the mucobuccal fold. The patient had had his present dentures for eight

months, and said he could chew steak better than with his former dentures, but that at times he chewed his cheeks when chewing a mouthful of food or when swallowing saliva.

Examination of the mouth revealed moderate hyperplastic tissue overlying the upper anterior alveolar region; large parotid papillae, and prominent Fordyce granules. In the mucosa of each cheek, opposite the posterior blocks, was a red line with swelling.

The loops of the metal inserts toward the buccal surface were ground and polished to relieve the square shoulders of the cutting edges and thus reduce their tendency to pinch the mucosa. One week later the red line was much reduced. The lower cutters were ground to the level of the enveloping blocks and polished.

It seems that if the new, and more efficient, cutters are to be used, it would be wise in many instances to use them in the upper denture only, and on or inside the upper ridge line, so that the lower posterior teeth, of flat cusped porcelain, are placed buccally, in cross-bite relation, so that the tendency for the cheek to get caught is lessened.

In the case described, acrylic resin could have been added to the lower denture or to both dentures, instead of grinding the metal cutters in the lower posterior plastic blocks. The patient, however, was generally satisfied with his dentures as they were.

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Palatal and facial prosthesis

Congenital oral deformities

C. Kerr McNeil. *Brit.D.J.* 101:191-198 Sept. 18, 1956

Until recently, cleft palate has been treated surgically or by mechanical means. In some quarters, however, additional methods are being employed successfully for closure of hard palate clefts. These defects are being closed nonsurgically, by taking advantage of normal growth factors—periods when there is acceleration of growth and periods when the osteogenic potential is high.

The principle underlying nonsurgical closure is mechanical stimulation of the growth impulse during the periods mentioned. The nonsurgical closure of hard palate defects depends on stimulation of growth of the bony tissues of the hard palate. Most instances treated in this way have been those in which secondary repair was indicated—where there had been breakdown of tissue after surgical treatment, or where the hard palate, or part of it, had been left unclosed by the surgeon.

The appliances used for bone stimulation are of simple design. The action is such that gentle pressure is brought to bear over a considerable area of the hard palate. Care is taken so that no pressure is applied to the free edges of the palatal defect. It has been observed in instances where arch expansion or correction is carried out concurrently with stimulation of growth, that the closure process is accelerated. This is probably due to further stimulation of the palatal region as a result of the additional forces employed for arch correction.

Simple intraoral appliances may be used also to control the dental arch in early infancy. If there is arch asymmetry, anomalies of function present themselves with regard to respiration, swallowing, mastication and speech. The bringing about of a more normal arch at an early age influences development of the facial skeleton as a whole, and tends to produce a growth pattern directed strongly toward normality. The intraoral appliances are constructed on a series of models modified progressively toward normality. Their function is to mold the deformed arch into correct anatomic alignment. Treatment usually is commenced about six weeks prior to lip repair. Little difficulty is experienced, the appliances being well tolerated by young patients.

Corrective measures should be commenced as early as possible in instances of bilateral involvement of lip and alveolar ridge, and of cleft of the hard and soft palates.

Armamentarium

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Equipment

Progress in measuring and regulating technics (Progrès réalisés dans la technique des mesures et du réglage)

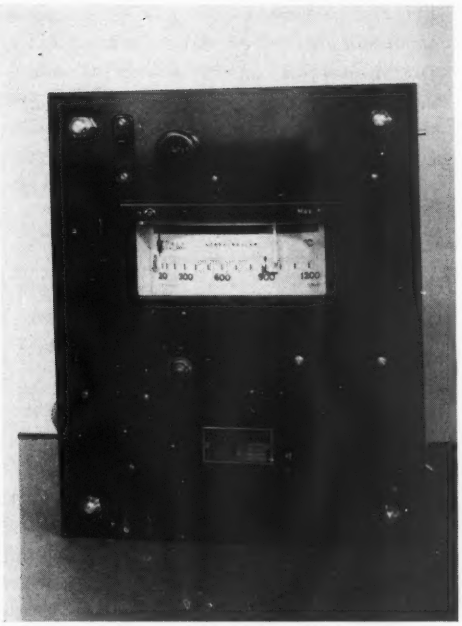
V. J. Krosta. *Dent.Echo* 26:81-83 March 1956

In dental laboratory work with refined steel alloys or with chrome-cobalt alloys, the customary technics frequently seem inadequate. It is necessary to combine technical refinements with a more accurate control of working procedures. A constant measure and regulation of temperature is important.

The recently introduced "Var" and "Uvar" regulators control the temperature automatically and can be used in all complicated and lengthy heating and cooling processes.

Preheating of casts should be slow and uniform. In most customary technics, the current has to be switched on and off to ensure an equal distribution of heat to prevent cracking caused by internal stress. Careful observation of the temperature is necessary to assure that the desired rise takes place at the desired speed. Careless observation may cause damage to the material and fusion of heating elements. The Uvar regulator controls the temperature. The heating procedure can be performed automatically at night so that the pouring process can take place in the morning. A full day, therefore, is available for finishing the casts. The built-in control clock switches the current on and off at a predetermined time, and the regulator keeps the temperature at the desired degree. The capacity of both the clock and the regulator is rather high so that even larger appliances can be attached and controlled without an auxiliary relay.

The thermocoupling device provides additional safety, especially for heating appliances operated



Top picture: Var regulator without control clock

Bottom picture: Uvar regulator with control clock

without supervision. Built-in pilot lights indicate the position to which regulator and control clock are set. The great reliability and precision of both the Var and Uvar regulators as well as their long life (several million control operations are possible) make these appliances a valuable addition to the dentist's and dental laboratory equipment.

The Airdent unit

O. L. Schaefer. *New Mexico D.J.* 7:10-11 Nov. 1956

The Airdent unit was installed in the author's office five and a half years ago. Today it is used on 80 to 85 per cent of all anterior teeth requiring other than digital preparation, on about 15 to 20 per cent of all preparations on lower posterior teeth and on upper teeth where direct access and vision are available. In prophylaxis the use of the Airdent is limited to those procedures which would be too time consuming or difficult with cup and pumice, or where the patient requests the Airdent.

The Airdent has been found ideal for cleaning partial and complete dentures, for preparing new cutting or grinding grooves in porcelain teeth, for removing bits of broken porcelain teeth in dentures, for roughening the surface of plastic dentures in preparation for repairs, and for preparing porcelain teeth for gold fillings. The Airdent saves considerable time when used to remove old cement fillings. Class III and Class V preparations are done simply, in seconds, without anesthesia.

The Airdent is not used 100 per cent of the time because some work done with the Airdent requires more time by far in the preparation for use of the Airdent than in its actual use. The removal of old metal restorations is a slow, tedious task with the Airdent, as is the preparation of posterior maxillary teeth.

An outstanding fault of the Airdent is that it will not do everything which can be done with rotary methods; thus it means a duplication of expense for equipment. This is of little consequence if the dentist considers the time saved through the judicious use of Airdent and rotary equipment. The high-speed rotary equipment saves considerable time in many operations.

▼ Instruments

The influence of design factors on the performance of the inverted cone bur

E. E. Henry. *J.D.Res.* 35:704-713 Oct. 1956

The advent of cavity shaping technics which utilize high rotational speeds and a light hand pressure to remove a large amount of tooth material has resulted in an acute awareness by dentists that some burs are superior to others. The cutting ability of a bur depends on two qualities: (1) the true cutting ability and (2) any clogging tendencies.

Some results obtained during a testing program designed to show the effects of different design variables on the performance of the inverted cone bur are reported. The six variables tested are flute finish, heat treatment, end flutes, diameter of bur, length of engagement or cutting depth and the number of flutes in the bur. The results are expressed as graphs showing the average linear displacement per flute revolution as a function of the peripheral velocity. The average linear displacement per flute revolution is equivalent to the average distance that the bur advances into the cut per flute revolution. This manner of data presentation demonstrates changes in edge cutting ability effectively.

Only the last one thousandth of an inch of flute edge is effective for cutting a soft material. This dimension decreases as the hardness of the material increases until only a few microinches of blade edge are effective in some instances. A major manufacturing difficulty lies in producing equally sharp edges consistently, that is, bur flutes that are identical within the outer one thousandth of an inch.

The flutes of commercial burs usually have some fins or excess material. It may be removed by subsequent cuttings of the flutes. It has been found, however, that the small increase in the effectiveness of the bur does not warrant the extra cost. Heat treatment must retain the sharp edge placed on the flute by the cutter as well as harden the bur and increase its cutting life.

During peripheral cutting the end flutes are inoperative. Test results indicate that the "Reve-

lation" type flute is superior to the "Star" type end flute and the bur without end flutes. The results, however, are not conclusive.

The average linear displacement per flute revolution does not depend noticeably on velocity, indicating that the length of cut is nearly constant irrespective of reasonable changes in bur diameter. Changing the length of engagement as well as the number of flutes changes the manner in which the external load is distributed among the flutes of the burs. If the force on the flute is increased, the average displacement per flute revolution is increased. This occurs when either the length of engagement or the number of flutes is decreased.

▼ Therapeutics

Vitamin F in the local treatment of periodontal disease

(Erfahrungen mit Vitamin F bei der lokalen Behandlung von Parodontopathien)

K. H. Guhrke. *Deut.Stomat.* 6:495-500 Aug. 1956

Vitamin F is the collective term applied to fatty acids such as linoleic, linolenic and arachidonic acids which contain carbon, hydrogen and oxygen, and form an alkyl radical which belongs to the carboxyl group.

Vitamin F, usually produced from wheat germs, recently has appeared on the German pharmaceutical market in the form of a chemically produced massage paste.

In the local treatment of periodontal disease, this vitamin F paste has proved effective in obtaining immediate relief from inflammatory symptoms of the gingiva. After from two to three massages, the natural transparency of the gingival mucous membrane reappeared.

According to the results of a study on the effectiveness of vitamin F pastes conducted at the Dental Polyclinic at Henningsdorf, Germany, in which more than 1,000 patients afflicted with periodontitis and periodontosis were examined, cure was obtained in 82 per cent. The remaining 18 per cent of the patients required subsequent treatment by periodontists and internists. In a few instances, the periodontal disease was caused or promoted by severe malocclusion. In these instances, the orthodontist completed the treatment.

A review of current opinion on the hazards of indiscriminate antibiotic therapy in dental practice

Stanley L. Lane. *Oral Surg., Oral Med. & Oral Path.* 9:952-961 Sept. 1956

The few definite indications for antibiotic therapy in dental practice include: (1) treatment of dental patients suffering from rheumatic or congenital heart disease in whom a transient bacteremia may have disastrous consequences; (2) prevention of secondary osteomyelitis in conditions such as fracture of the jaw and difficult extraction of lower molars, provided that infection is absent at the time of the operation; (3) prevention of infection after accidental entry into the maxillary sinus during extraction, and (4) clearing of gross local oral infections prior to operative procedures. In such instances it is necessary to conduct bacteriologic laboratory studies to determine the choice of the antibiotic, based on the susceptibility of the causative organisms.

In all instances where antibiotics are to be employed, a history of the patient's past exposure and reactions to antibiotics, and his clinical history of other allergic reactions, should be taken.

The routine use of antibiotics appears to be contraindicated: (1) for oral infections, such as pericoronitis and periodontitis; (2) in general dental surgery where no specific need is apparent; (3) for the treatment of viral infections of the oral region, such as herpes simplex and herpetic stomatitis, and (4) for any pathologic condition of unknown etiology. Antibiotics should not be used routinely in dental cones to be placed in tooth sockets after extraction, nor in dentifrices for caries prevention.

The possible untoward effects brought about by antibiotics include acute anaphylactic toxic

reactions related to their sensitizing ability; patient intolerance resulting in allergic reactions; the development of antibiotic-resistant strains of ordinarily susceptible pathogenic strains of bacteria, and the emergence in large numbers of organisms normally antibiotic-resistant as antibiotic-labile organisms are suppressed.

Prescription writing in dentistry

Peter B. Perkins. *J.Mississippi D.A.* 12:15-18 Oct. 1956

In an effort to find out the prescription writing habits of Mississippi dentists, a simple questionnaire was mailed to the 480 white dentists in the state; 175 forms were returned.

The highest number of prescriptions written a week was 50 (two dentists) and the lowest number was 0 (17 dentists). The average number (also the median and mean) was 10 a week.

Eighty per cent of those writing prescriptions have a narcotics license.

An average of 55 per cent of the prescriptions written by those with a narcotics license were for narcotics.

Thirty-five per cent of the responding dentists reported they felt their instruction in pharmacology and prescription writing in dental school was inadequate. Of those who graduated from dental school prior to 1930, 60 per cent said such instruction was inadequate.

Sixty-five per cent reported they were not kept up to date on new drugs and on how to prescribe them.

Eighty per cent said they would prescribe more if they were kept better informed about current drugs and how to prescribe them.

Ninety per cent were interested in having informal meetings of small groups of dentists with qualified pharmacists to discuss drugs. Nearly all (95 per cent) were interested in having local pharmacists or drug house representatives occasionally tell them about drug developments.

A final question asked about groups of drugs in which the dentist might be interested; 78 per cent were interested in learning more about antibiotics and 50 per cent were interested in learning more about sedatives, vitamins, analgesics and narcotics. A few dentists were interested in antihistamines, general anesthetics and in hemostatics.

Penicillin V—phenoxymethyl penicillin—in dental practice

(La penicillina V—fenossi-metil-penicillina—nella pratica stomatologica ambulatoriale)

G. P. Venelli. *Minerva stomat.* 5:221-225 July-Aug. 1956

At the Dental Clinic of the University of Modena, Italy, 20 patients, afflicted with various oral infections, have been treated with penicillin V (phenoxymethyl penicillin).

This orally administered penicillin was therapeutically effective, because only fractions of the doses administered were absorbed by the gastrointestinal tract.

It was established that penicillin V is five times as resistant to acid inactivation as penicillin G, and twice as much of penicillin V is excreted in an active form than of penicillin G.

When tested against numerous strains of *Micrococcus aureus,* penicillin V proved to be superior to penicillin G against both the penicillin-sensitive and the penicillin-resistant strains. Orally administered, penicillin V did not produce a higher blood concentration than penicillin G. Penicillin V is virtually unaffected by an appreciable quantity of gastric acid which would destroy penicillin G.

It can be concluded that penicillin V, administered orally, is an effective, safe, and reliable therapeutic agent for the majority of penicillin-treatable infections to be found in dental practice.

Its advantages, however, must be evaluated in terms of possible shortcomings and disadvantages which have to be determined by further investigations with more patients.

Periodontics and endodontics

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Periodontics

Complete closure of interproximal space with splints

(Der Totalverschluss des Interdentalraums mittels Geschieben)

Arnold Gaerny. *Schweiz.Mschr.Zahnhk.* 66:553-559 June 1956

In the clinical management of periodontal disease, recent advances in surgery and electrosurgery and the introduction of new drugs have produced appreciable results. The extensive use of these modern technics has brought to light the necessity for a wider knowledge of the characteristics of this disease, its etiology and course of treatment.

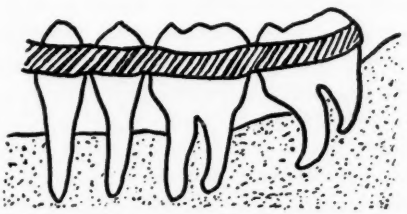

Figure 1 Temporary splinting. Food accumulation is not avoided

It is evident that certain mechanical procedures are invaluable for stabilization and fixation of poorly supported teeth, before, during and after treatment. The equilibration of the occlusion and the relief from abnormal stress should receive consideration. It has been established that the retention of food and other accumulations within the periodontally affected interproximal space of the teeth represents the most dangerous causative factor. This fact influenced the author to attempt the complete closure of the interproximal space with Steiger's channel-shoulder splint attachment. This appliance, known to international dentistry, was modified so that the attachment's shoulder is not carried into the interproximal space.

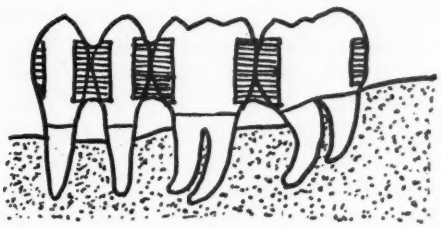

Figure 2 Customary splinting. Development of carious lesions is promoted

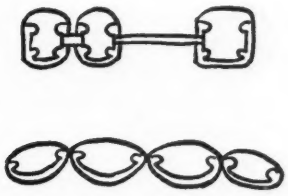

Figure 3 Complete closure of interproximal space with Steiger's channel-shoulder splints (above) and the author's splints (below)

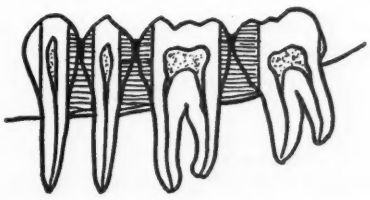

Figure 4 Construction of channel-shoulder splints. Preparation and paralleling

Steiger's channel-shoulder splints for interdental closure are constructed as permanent or removable appliances. For complete closure, however, only the removable type is recommended. It is constructed of chrome alloy, light in weight but extremely rigid under stress and force. The soldered parts, conventionally strong, should be cut to slender bars. These connecting parts, accurate in fit, should remain in contact with the interdental tissue. The parallel walls of connecting bars permit the carrying of the removable appliance down to the level of the interdental tissue.

The paralleling of the preparation to the interproximal surface of the abutment teeth, there-

fore, is imperative. In teeth out of proper alignment, this similarity is obtained by weaving a stainless steel wire around each tooth. A slight twist should be given to the wire at each interdental space. The loosened teeth then are supported by the teeth which are still firmly embedded. By using this technic, all traps for food accumulation are avoided, and small deposits, when they occur, can be removed easily by the patient's daily care.

The biologic results, proved in more than 150 patients within the last ten years, consist in the formation of deflecting contours and clear interproximal sluiceways. The tissues are kept healthy by a daily massage. The mucous membrane remains firm and pink and periodontal destruction ceases. The masticatory function can be retained for ten years and more.

Occlusal posterior splints, by using the same technic, can also be employed to advantage in instances in which complete rehabilitation is not indicated, but where a number of adjacent teeth require immediate treatment.

This method may be considered also as an adjunct to the treatment and prevention of occlusal trauma.

General pathology and classification of periodontal disease

(Pathologie générale et classification des parodontopathies)

Herbert Siegmund. *Parodontol.,Zürich* 10:101-103 Sept. 1956

In modern pathology, the previous idea of evaluating only the conditions which occur in certain diseases in isolated organs has been replaced by the idea of a functional unit which includes all or various parts of the human organism.

The functional masticatory system is composed of two morphologically distinct units. The teeth transmit forces, which change continuously under the occlusal stress, to the periodontal tissue.

From the functional, histogenetic and trophic standpoints, the tooth cementum also is a part of the periodontal unit, the periodontium, as are the periodontal membrane, the gingiva and the alveolar bone. The varying mechanical actions to which these investing and supporting tissues are subjected produce tissue reactions which depend on the tangential traction on the tooth surfaces.

The periodontal structure is not stable; it is in continuous transformation which is caused and promoted by the tissue reaction to force transmitted to it by the teeth. Each dental unit, "odontonne," possesses its own periodontal membrane. The structure of this membrane is determined by the function executed by the particular tooth unit within the dental arch.

The type of periodontal disease can be determined from the fact that the normal structural system which had fixed the tooth in its supporting tissue is suddenly unable to adapt itself to changed functional conditions.

From the moment a disproportionate factor has intervened between the forces acting on the teeth and the biologic potential of the periodontal tissue, symptoms of a disequilibrium in adaptation and adaptability occur.

Mechanical action then is transformed into metabolic disturbances by the supporting tissues, partly by a disorganization within the cellular structures, and partly by irritation of the vasomotor nerve fibers of the periodontal membrane. The blood supply is altered and disturbances in the nervous and circulatory systems (neurocirculatory dystrophy) appear.

Depending on the different thresholds of irritability and the neurovegetative tonus, identical factors may cause various circulatory and trophic disturbances such as ischemic dystrophy, reduced metabolism, tissue atrophy and hyperemic dystrophy. These conditions may cause the formation of exudative inflammation and augmentation of the metabolism with severe consequences.

Based on established pathologic conditions, a subdivision of marginal periodontal diseases can be made as follows: (1) periodontitis (inflammatory type); (2) periodontosis (dystrophodysplastic type); and (3) periodontoma (neoplastic type).

Intermediate forms, between these fundamental types, are as follows: (1) dystrophic periodontitis, and (2) inflammatory periodontosis.

These terms correspond to both the clinical and pathologic manifestations.

The five types of periodontal disease differentiated by Orban can be grouped easily under the three fundamental types. Traumatization, however, cannot be considered as a pathologic type; it is only an etiologic factor.

A classification of periodontal disease from the etiologic standpoint seems to be impossible, because the pathologic symptoms are caused by multiple factors.

Periodontal disease originates mainly from vascular disturbances accompanied by neurovegetative dysfunction in which alterations of the jaws and the periodontium are caused by functional changes determined by the individual tooth structure.

Prevention of periodontal disease by use of atomizers

(Paradentose-Prophylaxis durch Atomiseur)

Curt Guttmann. *Zahnärztl.Rundschau* 65:281-282 June 5, 1956

The etiology of periodontal disease, even its nomenclature, is unclear.

In instances of degeneration of the periodontal structures with or without inflammation, the elimination of calculus and of deep pockets is essential. Knowledge as to the causes of this disease, although still incomplete, has advanced to the point that rational treatment, in skilled hands, now can obtain success in the majority of instances. An early recognition of regressive alteration in the periodontium is essential for the prevention and arrest of this condition.

Degenerative changes in distant regions caused by foci of infection may occur if the condition is neglected. Usually, such changes result from an absorption of toxic material from gingival pockets.

Years ago, in most dental offices a large atomizer was used to spray carbonic acid solution over the involved regions to prevent what then was called "pyorrhea alveolaris." At that time, neither "dead sure" dentifrices nor medicated ointments were known which nowadays, according to the manufacturers' claims, work miracles in the prevention of periodontal disease. These and many other pharmaceutical remedies should be regarded with skepticism by dentists and patients.

For the prevention of periodontal disease and for the complete elimination of irritating subgingival calculus, repeated spraying of the gingival region with hand atomizers still is the best method known. The desired hyperemization will be obtained quickly. The water in the ascending pipe of the atomizer should be kept warm, not too hot or too cold, to prevent irritation of the sensitive dentin.

Patients should be advised to obtain small hand atomizers, so that they can spray the involved region every day.

The atomizer treatment should be added to the customary therapy of periodontal disease. The solution can contain a mild disinfectant. The desired cleansing and hyperemic effects are achieved with the strong force exerted within the atomizer by carbon dioxide pressure.

The manipulation of hand atomizers is as easy and satisfying as their preventive and curative effects. No therapeutic drug or method can equal the effectiveness of these instruments.

The Charters method of toothbrush massage: a valuable supplement in periodontal therapy

Harry Roth, Jack Thaller and Norman E. Alderman. *J.Periodont.* 27:309-312 Oct. 1956

The modified Stillman method of toothbrush massage has been found satisfactory for the vast majority of patients at New York University College of Dentistry. In instances where isolated areas failed to respond with routine home care procedure, the Charters method was used to supplement the modified Stillman method.

In the Charters method, the sides of the bristles work interproximally and cleanse the embrasures as well as reach the thick labiolingual plate of gingival tissue for massage. The effect is that of many interdental stimulators working simultaneously.

With the Charters method the ends of the bristles are placed in contact with the enamel of the teeth and the gingival tissue, with the bristles pointed at about a 45 degree angle toward the occlusal surfaces. Lateral and downward pressure

is then placed on the brush which is vibrated gently with the handle being moved back and forth 1 mm. or so. This gentle vibratory procedure forces the ends of the bristles between the teeth and cleans the interproximal tooth surfaces while it massages the gingiva.

The Charters method is recommended for the following conditions: teeth with cervical erosion; teeth with recession; malposed teeth; abutment teeth supporting a removable prosthesis; a diminished vestibular area caused by anterior or posterior recession of the gingiva or by a paucity of gingiva in the second and third molar region; abutment teeth in fixed prosthesis; after gingivoplasty or gingivectomy; where a tendency to proliferation of gingival tissue due to mouth-breathing exists; crater effect of interproximate gingivae after necrotizing ulcerative gingivitis, and where wire or acrylic resin is being employed for temporary splinting.

A contraindication is the presence of full interproximal papillae supported by normal interseptal bony crests.

Specific areas that failed to respond after months of toothbrushing with the modified Stillman method showed pronounced improvement in tissue tone after two to three weeks of toothbrush massage with the Charters method.

Gingivitis in school children

D. H. Goose and J. G. Potter.
Pub.Health,London 70:14-15 Oct. 1956

Two hundred and thirty-nine boys and 168 girls from 7 to 15 years old visiting dental clinics in West Bromwich (a county borough in the industrial Midlands) were examined for gingivitis; 91.2 per cent had gingivitis, mostly either simple or inflammatory hyperplasia (hypertrophic gingivitis). The PMA (papilla, marginal and attached gingiva) index was 11.41, substantially higher than the PMA index found by other investigators in Chicago and Philadelphia.

Four possible reasons why gingival conditions in West Bromwich are worse are as follows:

1. Gingivitis due to erupting permanent teeth and loosening temporary ones is included in the results from West Bromwich.

2. Untreated caries of the deciduous dentition (of which there was much) was responsible for at least some of the gingivitis.

3. There was a poor standard of oral hygiene due partly to the lack of toothbrushing. Only 69 boys (28.9 per cent) and 83 girls (49.4 per cent) brushed their teeth at least once a day.

4. Eighty-seven children had open lips when the mandible was in a position of rest, and lack of lip seal is known to be a cause of anterior gingivitis.

Masticatory efficiency and periodontal disease

J. W. Galloway. *D.Practitioner* 7:2-10 Sept. 1956

The ultimate aim of any dental treatment should be to preserve or provide for the patient as high a standard of dental competency as conditions will allow. The dentist should be able to measure his patient's dental efficiency.

If an individual has sound teeth (in good occlusion, with intact periodontium, in well-formed arches), well-developed jaws and muscles, and healthy salivary glands, he has a good masticatory "potential." Whether he is able to use this potential depends on his masticatory "proficiency," that is, the proper functioning of his muscles and temporomandibular joints, his neuromuscular mechanism and the quantity and consistency of his saliva.

The working parts of the masticatory mechanism—the masticatory potential—consist of the teeth, periodontium, jaws, muscles, tongue, salivary glands, vessels and nerves. The masticatory proficiency is the integrated action of the following: chewing movements, habit patterns, biting strength, salivation, swallowing threshold, ability to adapt the action for different kinds of food, and ability to compensate for defects in the mechanism itself.

A survey of what constitutes masticatory efficiency shows that there is still much to learn before an accurate valuation can be given. The examination and estimation of a patient's proficiency still lie in the academic sphere. Examination by myelography, oscillography, palatography,

laminagraphy, cinefluoroscopy and cinematography are methods by which a more exact knowledge of the physiology of mastication may be obtained. If the physiology is known, the pathology will be understood.

Orthodontists have studied the development of jaws and teeth and the effect of growth and masticatory forces on bone up to the age of maturity. The effects on these structures and forces of tooth instability or loss in adult years are less well understood. The periodontist must have a similar outlook to the orthodontist; it would be advantageous if they were close partners. The investigation of the predisposing and etiologic factors of periodontal disease must take into account masticatory efficiency.

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Endodontics

Clinical and histopathologic investigation of the healing of radicular cysts after endodontic treatment

(Klinisk-histopatologisk undersökning över Läkningsforloppet vid konservativ behandling av radikulära cystor)

T. Lehrmark. *Odont.Revy* 7:221-241 April 1956

The effect of the cathode-iontophoresis treatment is explained by the theory that therapeutically active ions are introduced into the pathologically altered tissue. In the present work this method was applied to the treatment of teeth with radicular cysts. The clinical material was divided into three groups.

In Group A_1, the cystic teeth were subjected to cathode-iontophoresis and the root canals filled. Roentgenograms were taken periodically for from several months up to a few years. Tissue was removed for biopsy in instances in which changes in the outline of the cyst were observed roentgenographically.

In Group A_2, the treatment was exactly the same, except that two biopsy specimens were taken instead of one. The first was taken during root canal treatment, the other at a later stage as in Group A_1.

In Group B, two biopsy specimens were taken, as in Group A_2, but no treatment of the cystic teeth was attempted.

The root canals were cleaned mechanically, but no effort was made to penetrate the apical foramen. A rubber dam was used, and care was taken to isolate or remove any metal fillings in the teeth. Broaches were wound with cotton, dipped in Grossman's solution, and introduced into the root canals. They were connected with the negative electrode of the iontophoresis apparatus, and the positive electrode was placed in the hand of the patient.

The iontophoresis treatment was carried out in from one to four visits with a total dosage varying from 37 to 140 milliampere minutes after which the canals were filled with gutta-percha.

Roentgenograms of the teeth from Group A_1 and Group A_2 all showed progressive healing of the bone defects beginning one to two months after the iontophoresis treatment. In biopsies made at an early postoperative stage, the bone defects were filled with soft tissue. Histologically this appeared as granulation tissue with islands of degenerating epithelium. In one biopsy made 83 weeks after the operation, no bone defect was present.

In Group B no healing was seen. It may be assumed that the removal of tissue for biopsy in the other two groups was not in itself of any therapeutic value. It appears that cathode-iontophoresis stimulates the mesenchymal tissue surrounding the cyst. New bone is laid down, and the epithelial lining of the cyst undergoes regressive changes.

Preventive and public health dentistry

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Caries etiology and control

Studies of the early lesion of enamel caries with transmitted light, polarised light and radiography

A.I. Darling. *Brit.D.J.* 101:289-297 Nov. 6, 1956
101:329-341 Nov. 20, 1956

There is abundant evidence that two processes take part in the production of the carious lesion. These are decalcification and alteration of the organic matrix. Each has been shown to take part, but it has not yet been determined which causes the initial attack.

If the findings obtained in studies of the early lesion of enamel caries in transmitted light, polarized light and by roentgenography are reviewed, it seems that there are four zones in the early lesion of enamel caries without cavitation, but their various features can be recognized only by different technics.

The body of the lesion shows decalcification with cross-striations of the prisms and enhanced striae of Retzius. At the enamel surface over the lesion lies a well-calcified zone for which no explanation is offered. Beneath the lesion lies a dark zone which is positively birefringent and unimbibable. Keil (1936) suggests that this may be caused by gases, for example, carbon dioxide retained in the decalcified enamel. If this is so, it is difficult to understand why the gas is not soon displaced.

Beneath the dark zone and between it and the normal enamel is, at times, the "translucent zone." This was described by Mummery (1926) who suggested that it is hypercalcified and is a protective reaction against caries. Darling (1943) showed that similar zones could be produced by artificial caries in extracted teeth where they could not have been caused by hypercalcification of systemic origin.

In an attempt to try to understand better the early carious lesion of the enamel, two freshly extracted bicuspids, each showing early evidence of caries at one contact point, were studied with transmitted light, polarized light and roentgenographically. Sections of teeth subjected to artificial caries and lactic acid decalcification were studied in the same way. The following conclusions were reached:

1. The lesions of early natural caries as seen in transmitted light, polarized light and by roentgenography are comparable in all respects with the lesions produced in unabraded enamel by artificial caries or decalcification by very dilute lactic acid.

2. All show pronounced evidence of decalcification.

3. No evidence of organic change was found in two early lesions of enamel caries, though decalcification was present.

4. A "positive zone" has been shown at the surface of early carious lesions of the enamel as well as at the deep margins of these lesions.

5. The positive zones of enamel caries have been shown to be artefacts produced by ethyl alcohol. They disappear in watery media.

6. The presence of the well-calcified surface zone in enamel caries has been confirmed.

7. A new theory of the mode of attack of caries on enamel is suggested to explain these facts.

The generally accepted pattern of attack on the enamel by caries is invasion from the surface on a gradually broadening front and in a saucer-shaped or concentric manner. In the sections examined, such a pattern of attack does not exist.

The evidence on the spread of decalcification indicates that the lesion extends from a point within the enamel. It must therefore be assumed that the decalcifying agents at the surface first penetrate the well-calcified outer layer of enamel before decalcification of the inner enamel can take place. This penetration, apparently without damaging the outer layer, must imply the existence of one or more small points of entry through this outer barrier.

The lesion could gradually extend within the enamel both radially into the enamel and toward the surface, though decalcification of the surface zone is slower than the central penetration. Thus, the surface zone is undermined in early lesions.

Figure 1 Very early enamel caries seen by polarized light with quartz sensitive tint. The lesion consists chiefly of positively birefringent enamel with some negative enamel at the center. It also shows two or three small connections with the surface which might be points of entry

Figure 2 Ground section of enamel showing two very small globular lesions within the enamel. The section is mounted in quinoline. A: As seen by transmitted light. B: As seen roentgenographically. C: As seen by polarized light

Throughout this process the advancing edge of the lesion is outlined by the positive zone, but the visible decalcification as seen in roentgenograms represents only the grosser effects of the lesion. Gradually, the advancing edge of the lesion passes through the surface zone and opens on to the surface.

From this stage onward, the positive zone will be absent from the outer border of the lesion, though the well-calcified zone will persist for some time longer. It is probable that at this stage the organisms responsible for alteration of the organic matrix gain access and eventually cause a breakdown of the enamel with cavitation.

This theory of attack seems to explain all the available facts, but it would be much more acceptable if the points of entry could be demonstrated, or the early globular lesion found in natural caries, or some explanation offered for the apparent protection of the enamel surface against decalcification from without.

Two lesions found in the same ground section, Figure 2, seemed to show the exact picture of the very early globular lesion of enamel caries just beginning to spread radially after the entry of the decalcifying agent through the small point of entry as postulated above. The tooth showed no clinical evidence of caries before section. In the absence of evidence to the contrary, Figure 2 must be regarded as depicting the earliest lesions of caries so far described in the literature, and supporting evidence for the theory here advanced.

Estimation of the chloride level of saliva

John T. Anders. *J.D.Res.* 35:753-759 Oct. 1956

The presence in saliva of the chloride ion and its possible effect on tooth decay were investigated. Two hundred and fifty-one children whose ages ranged from 3 years 6 months to 15 years 2 months were tested between January and June, 1954. The range of the salivary chloride for this group varied from 6.49 to 37.88 milliequivalent chloride per liter. All tests were done on saliva obtained without mechanical stimulation. The dental condition of the children ranged from complete absence of decay to "rampant decay."

A method for measuring the chloride ion concentration of the saliva and a method for classification of subjects according to the DMF index are presented. A significant difference was found to exist between the chloride level of the caries-free group and that of the group with most extensive and rapid carious breakdown.

The chloride ion may play an indirect role in the incidence of caries. The presence of the chloride ion appears essential for the satisfactory action of amylase on the ingested carbohydrates; its role seems to be that of either an activator, a catalyst, or a component of a coenzyme. More work will have to be done to gain insight into the mechanism of chloride action in the saliva.

The effect of varying times of desalivation on enamel maturation in the caries-susceptible albino rat

Richard A. Edelstein. *Harvard D.Alumni Bul.* 16:7-12,16 Oct. 1956.

Caries-susceptible albino rats were divided into four groups of similar sex and littermate distribution and were desalivated at 10, 14, 18 and 21 days of age. Two strains of rats were used. The animals were weaned at 25 days of age and placed on ration 700, a high sucrose, caries-producing diet.

In the Navy strain, statistically significant differences were found with respect to the extent and incidence of caries between the 21 day group and the other groups. The animals in the 21 day group exhibited considerably less decay than those desalivated earlier.

In the mutant albino group, those animals desalivated at 14 days exhibited greater decay than those desalivated at 18 and 21 days. A significant difference was found between the 14 day and the 18 day group.

The difference in the incidence and extent of caries between animals differing primarily in the dates when they were desalivated is perhaps explainable by the theory of the maturation period of enamel. According to this theory, there exists an immature period during which the inorganic and organic nature of the enamel would render it more susceptible to decay. This theory further contends that saliva is necessary for enamel to

reach its mature state, postulating an ionic exchange between enamel and saliva similar to that observed between bone and extracellular fluid. Thus, the earlier an animal was subjected to desalivation, the less chance the animal would have to develop mature enamel and the greater chance to show increased incidence and extent of caries.

The experiment should be repeated with a larger number of animals and more careful clinical observation to determine the approximate amount of decay, thus enabling the experimenter to stop the experiment when the carious process was not as far advanced as in the present work. Further differences might be observed if this were done, particularly in the 18 day salivated group.

The sweet tooth

Ralph R. Steinman. *Life & Health* 71:16-17,21 Nov. 1956

Researchers at the College of Medical Evangelists School of Dentistry selected two types of meals from the food at the school cafeteria. The first selection contained generous amounts of milk, eggs, fruits, legumes, vegetables and whole grain products, and no desserts. This food was fed laboratory rats at regular intervals, one hour in the morning and one hour in the evening, with nothing between meals. The animals were always hungry. The rats grew well and were apparently healthy. At the end of 14 weeks their dental examination showed 0.62 cavity per animal; the rats had almost perfect teeth.

The second selected meal included a smaller amount of milk, fruit and vegetables, refined or highly processed grain products and desserts. The fruits were canned with large amounts of sugar. Light breads were used, as were pancakes and syrup, jam, sugar cereals, ordinary dry cereals, chocolate milk, pie, macaroni and ice cream. The animals were fed on the same two-meal-a-day basis, but they were also given between-meal snacks of candy, soft drinks and cookies. The rats were not too well nourished. They did not grow well. One sickened and died before the end of the experiment. On the average each rat had 30.7 extensive cavities.

▼ School dentistry

School dentistry in Scandinavian countries

(Organisation und Entwicklung der Schulzahnpflege in den skandinavischen Ländern)

A. Syrrist, Stockholm. *Schweiz.Mschr.Zahnhk.* 66:807 Sept. 1956

In 1909, at the Fifth International Dental Congress which was held in Berlin, the following resolution was adopted unanimously: "The immediate creation of dental clinics for children is a necessity for general public health."

Sweden was the first European country to have dental clinics for school children. By 1895, more than 17,000 children were being examined periodically by dentists who had volunteered their services. A few years later, the Swedish public health authorities realized the necessity for attaching dental clinics to primary and secondary schools, and in 1905 the first school dental clinic was opened in Stockholm.

In 1955, about 600 excellently equipped school dental clinics with 1,400 employed school dentists rendered dental service to more than 600,000 school children.

In Norway, the development and organization of school dentistry took place in a similar manner. Norway was the first country in the world to introduce compulsory dental examinations for school children. In 1955, of the 1,900 Norwegian dentists, 600 served in school dental clinics. No fees are charged for dental examinations or simple treatment of children from 6 to 10 years old or of students from 10 to 18 years old.

In Denmark and Finland, however, school dentistry is left to local governments which receive subventions from the federal government.

In all four Scandinavian countries, school dentistry functions excellently. It is planned that this service should also be rendered to preschool children from three to six years old. The treatment in school dental clinics is not limited to treatment and prevention of caries; orthodontic, prosthodontic and oral surgical treatment also is provided.

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Statistical research

On basic principles in dental statistics

Jaakko Kihlberg and Kalevi Koski, Helsinki.
Human Biol. 28:365-375 Sept. 1956

In current dental statistical literature, diversity exists both as to statistical presentation and as to methods and concepts. It is not always possible to make direct comparisons between two related published investigations.

A statistical framework is proposed within which a logical dental statistical system can be developed. The proposed system is based on the simple classification of teeth in five exclusive classes, as follows: tooth not erupted; tooth in the mouth, sound; tooth in the mouth, attacked by caries; tooth lost while sound, and tooth lost while attacked by caries.

It is proposed that a series of age-specific percentage distributions of the tooth loci into these classes, or a collective distribution pattern, be used for each tooth separately as a basis of further statistics.

Dental focal infection and mortality statistics

(Odontogene Herderkrankungen im Spiegel der Mortalitätsstatistik)

E. Bartha, Debrecen, Hungary.
Zahnärztl.Rundschau 65:311-315 July 5, 1956

At the Dental Institute of the University of Debrecen, Hungary, the primary causes of death from various diseases of the heart, blood vessels and kidneys, commonly regarded as being associated with dental focal infection, were investigated.

By accepting the hypothesis that dental foci induce secondary systemic diseases, differences of opinion are expected to arise in regard to the frequency of mortality caused by cardiovascular and cardiovascular-renal diseases and to the relation between these diseases and dental caries in different population groups.

Mortality statistics of two Hungarian communities of about the same size were evaluated: (1) Kunszentmárton, where the drinking water contains from 0.7 to 1.5 ppm fluoride, and (2) Öszöd, where the drinking water contains less than 0.3 ppm fluoride. Both communities lie in the Hungarian plains, about 10 kilometers apart. The population in both communities consists mainly of farmers, their families and employees.

Data were compiled from the death registers of both villages covering the periods from 1901 to 1915 and from 1921 to 1940. Wartime entries were disregarded. The number of deceased persons was recorded, and the data assorted into the following categories: (1) infants, (2) children, (3) juveniles and (4) adults.

The cause of death was recorded as follows: (1) cardiovascular or cardiovascular renal diseases; (2) contagious diseases; (3) tuberculosis, and (4) various other diseases.

A statistically significant difference was observable in the causes of death by cardiovascular renal diseases with a lower figure in Kunszentmárton. The age of death, however, was lower at Kunszentmárton than it was at Öszöd.

A more thorough analysis of the compiled data revealed that no significant difference exists in the number of deaths by cardiovascular diseases between the two communities in the age group from 11 to 40. Differences found in the age group over 60 obviously were caused by an increase in arteriosclerosis. This condition, however, can hardly be associated with dental focal infection.

The result of the investigation cannot be interpreted as an evidence for the validity of the hypothesis that dental foci induce secondary systemic diseases with a lethal outcome.

This negative result does not exclude the possibility that a relation exists between dental focal infection and secondary diseases, or that focal diseases of dental origin exist.

The main purpose of this investigation was to obtain data which emphasize the necessity of further studies on a larger scale of focal infection and its possible relation to systemic disease, and to clarify the method in which such research should be conducted.

Basic science

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Histology

The directions of the enamel rods in central longitudinal sections throughout all kinds of permanent teeth

Takao Fusayama, Terumi Higaki and Chieko Uehara. *Bul.Tokyo M.D.Univ.* 3:43-49 July 1956

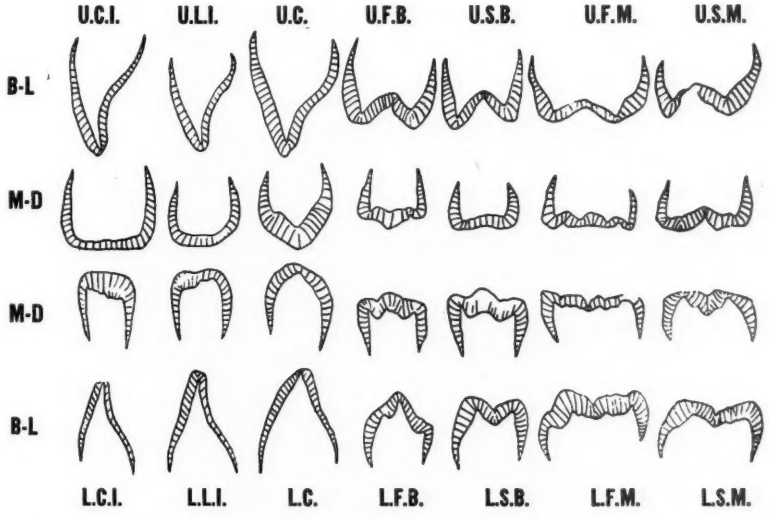
Although tooth enamel is the hardest tissue in the human body, it is brittle in the direction parallel to the enamel rods. To prevent the fracture of cavity margins during or after filling, the enamel wall of the cavity must be designed with the direction of the rods in mind. At the beginning of this century, G. V. Black investigated this problem and published schematic drawings indicating the direction of enamel rods.

The authors investigated the direction of enamel rods as seen in the buccolingual and mesiodistal central longitudinal sections of all permanent teeth. Observations are summarized in schematic drawings showing the directions of the rods. The following conclusions were reached:

1. Enamel rods in the longitudinal sections of teeth generally are straight, though some curve near the dentinoenamel junction.

2. The enamel rods in the occlusal inclines slant toward the cusps in relation to the enamel surfaces, but toward pits or fissures in relation to the crown axes. The external ends of the rods radiate toward pits or fissures. Therefore, in extending cavities with fissure burs along pits and fissures, no free enamel should be left unless the outlines extend beyond the cusps and ridges. Cavity outlines should not be stopped on the diverging inclining surfaces, however, because the rods on such bevels diverge and free enamel rods may be left on cavity margins.

3. The enamel patterns are rather complicated and the rods change direction suddenly on cusps, incisal edges and angles, so that cavity margins generally should be avoided in these places. An



Schematic illustration of enamel rod directions on the buccolingual and mesiodistal central longitudinal sections of all permanent tooth kinds

adequate slant must be given to the enamel wall if clinical conditions compel the operator to stop the cavity margins in such places.

4. The occlusal enamel rods near the marginal ridges incline slightly proximally; the distal or mesial enamel walls of occlusal cavities should also incline slightly proximally.

5. The enamel rods near the incisal edges and the occlusal surfaces always incline incisally and occlusally, respectively. The maximum angle is 42 degrees in relation to a line perpendicular to the enamel surface, and 70 degrees in relation to the crown axes. The incisal enamel walls of proximal cavities of anterior teeth must incline fairly incisally in relation to the estimated direction of the rods.

6. The enamel rods near the tooth cervix incline more or less cervically, the maximum inclination being 33 degrees in relation to a line perpendicular to the enamel surface and 48 degrees in relation to the crown axis. The cervical enamel walls of the cavity must incline cervically according to the estimated direction of the rods.

A histochemical study on the polysaccharide in gingiva in patients with periodontal disease (Shiniku-shikon maku Shikkan niokeru shiniku soshiki no tatorui ni kansuru soshiki kagakuteki kenkyu)

Masahiko Mori and Yoshindo Ogata.
J.Japan Stomat.Soc. 5:149-152 April 1956

A histochemical study was carried out on gingival tissue taken from diseased supporting tissue which was tentatively classified into three categories: acute or subacute inflammatory, hypertrophic inflammatory and atrophic periodontosis.

A gingival section was fixed in Carnoy's solution or buffered Formalin and then made into paraffin sections. Lillie's method of Schiff's periodic acid reaction test was applied to detect gingival polysaccharide, and the allochrom method was also used to observe submucous connective fibrils and basal membrane.

Polysaccharide deposition was always found in the epithelial cells in all three categories. In hypertrophic gingiva it was the most abundant and general in the epithelial cell layer, but in the acutely inflamed gingiva, such deposition was somewhat irregular. In instances of atrophic periodontosis, glycogen was deposited exclusively in the epithelial cells lining the inner surface of the pocket.

Generally the deposition was heavier in the polymorphic cells of the epithelium than in the basal cells where fine granules of reddish brown color were found instead.

Histochemical study of "PAS" positive, metachromatic and basophilic substances in periodontal tissues (Estudio histoquímico de las substancias "PAS" positivas, metacromáticas y basófilas en los tejidos periodontales)

Rómulo L. Cabrini y Fermín A. Carranza (h)
Rev.A.odont.Argentina 44:309-315 Aug. 1956

During recent years methods have been developed that permit, within relatively useful limits, the study of mucoid substances that contain amine radicals within a carbohydrate structure. These substances appear to possess great biologic importance and are distributed throughout the body tissues, especially within the connective tissues.

Of the biochemical technics to evidence their presence, the most important is undoubtedly the PAS (periodic acid Schiff) reaction.

Specimens were obtained during surgery, and consisted of large portions of periodontal tissues adhering to extracted teeth. These specimens were fixed in formaldehyde, in alcohol 80° at 4° C., in Rossman's solution, and in a 4 per cent solution of lead subacetate. The sections were colored by McManus and Hotchkiss' methods. Fifteen specimens, some normal and others with varying degrees of inflammation, were studied.

The gingival epithelium has PAS substances in the malpighian layers; it also has a positive reaction in the parakeratinized areas, and in a lower degree in the intercellular spaces.

The corium gives a positive reaction in the fibrous connective component, in the granules of mast cells and in the fibrocytes. The cells lose their reaction after the action of ptyalin.

The major part of the alveolar bone is PAS positive. The periodontal connective tissues react

in the same manner. Where the osteoblasts are in a region of bone apposition, they give a positive PAS reaction.

The metachromatic staining is localized especially in the connective bands of the corium and periodontal connective tissue. The mast cells have the most intense reaction. There is a slight reaction in the osteoid of recent formation.

The basophilia is especially localized in the cells of stratum malpighii.

Many reactions which are precise and exact in the test tube fail on tissue sections.

The isolation and examination of odontoblasts in the fresh unfixed state

Ivor R. H. Kramer. *Proc.Roy.Soc.Med.* 49:545-546 Aug. 1956

Odontoblasts are usually examined by means of stained decalcified sections. The processing of the tissues necessary in preparing such sections, however, makes it almost inevitable that a certain amount of distortion of the cells will occur. A method was devised to isolate the odontoblasts in the fresh unfixed state so that a truer picture of their morphology would be obtained.

Normal bicuspids extracted for orthodontic purposes were used. Immediately after extraction the teeth were placed in physiologic saline solution. With a diamond or "Vulcarbo" disk a shallow cut was made in the enamel of the mesial or distal surface, the cut running to the occlusal fissure. With the tooth resting on a firm surface, a straight enamel chisel was placed in the cut and struck a sharp blow with a hammer. This split the tooth in two, the plane of cleavage passing through the pulp chamber. The half of the tooth containing the pulp was taken and with a fine scalpel the pulp was peeled away from the dentin. With a sharp scalpel fine shavings of tissue were pared away approximately at right angles to the inner dentin surface, carrying with them some of the adherent odontoblasts. Throughout these manipulations the tissues were kept moist in physiologic saline solution. The shavings were collected in a drop of saline solution on a slide, a cover slip applied, and the specimen ringed with a petroleum jelly-paraffin wax mixture to prevent evaporation. Phase-difference microscopy was used to examine the preparation.

This method provided a number of slender dentin shavings in which the tubules were cut lengthwise. Where odontoblasts were adherent to these shavings, they could be identified with certainty, for their dentinal processes could be seen entering the tubules in the hard tissue fragments.

With practice, the preparations could be completed and under the microscope within five to six minutes after the tooth had been extracted. It was felt that the cells were unlikely to undergo serious morphologic change in this time.

X-ray microscopy of thin tissue sections

V.M. Mosley, David B. Scott and Ralph W.G. Wyckoff. *Science* 124:683-684 Oct. 12, 1956

The methods of projection roentgen-ray microscopy have now been developed to the point where they can be used to examine sections of tissue. Experiments were made with a projection roentgen-ray microscope as described by Nixon and Cosslett (1955).

Absorption in the several centimeters of air through which the rays pass in this apparatus must be eliminated if soft roentgen rays are to be used. This was done successfully by circulating helium through the enclosed specimen and photographic chamber. In early trials, gold or nickel foils about 1 micron thick served as target windows for the x-ray tube operated at 3 to 6 kilovolts; some image contrast was produced by thin specimens, but it was not adequate in photographs of soft tissue. Far better results were obtained when aluminum was used as a target window. Very satisfactory photographs with exposure times of 5 to 10 minutes have been obtained by operating the tube at 10 to 15 kilovolts, the target window being 7 microns of aluminum foil.

Two examples of such micrographs are shown, one being of decalcified human dentin. A 5 micron section of the methacrylate-imbedded tissue was cut on a rotary microtome equipped with a

glass knife, mounted in Formvar, and the plastic was removed. The dentinal tubules that run lengthwise of the section are clearly visible at the magnification of 450 times, as are many small fibers associated with them.

▼

Biology

Biological aspects of the buccodental organ

(Aspectos biológicos del aparato bucodentario)

Luis Sáenz de la Calzada *An.espan. odontoestomat.* 15:679-702 Sept. 1956

The first manifestation of life is probably that of the ameba, a unicellular being that creates its mouth wherever it pleases, and destroys it as soon as its capturing mission is accomplished. So the beginning of the nutritive intake is accomplished by the whole being, capable of creating and destroying a mouth. Only further along the zoological scale will a mouth be limited to certain parts of the organism. The ameba's method is a vital beginning, a maximum plasticity, a complete lack of specialization.

When the infusorian acquires a hard protoplasmatic membrane, the introduction of food is solved by the creation of an opening: the mouth, or stoma. And this stoma, with many variations, will remain all along the zoological scale up to man.

The paramecium is covered by a protective cuticle. At a certain point the cuticle is interrupted, and a funnel surrounded by cilia permits the entry of food. In the protoplasm a vacuole includes the food particle, secretes the digestive juices, and acts successively as stomach, intestines and anus.

Specialization creates gasteropods, cilia and tentacles. In pluricellular beings, the digestive vacuole is replaced by a cavity in communication with the exterior world through an opening—the mouth. Such is the origin of the gastrula, composed of ectoderm and endoderm. This latter layer is the more important of the two. It starts by being a simple cavity, as in the amphioxus, and finally becomes a complicated system of canals and cavities (actinozoa).

The foods enter the mouth, and here they can be selected. On the other hand, at the mouth is where ectoderm and endoderm meet. That is why the perimeter of the blastopore is destined to be an organ of transmission between the two germinative layers.

The plasmatic juices are not always sufficient to break down the solid food particles. So there appears a hard factor, capable of triturating food, in the form of dermic chitinous specializations of connective tissue.

Among the invertebrates, a tooth does not exist as such. Mastication takes place in a masticatory stomach, lined with parallel triturating columns. The tooth, or predentium, is an organ of prehension and of defense. The problems of "prey" and "enemy" are both solved in the mouth.

The real tooth appears in the vertebrates. In the lower vertebrates the mouth and tongue are covered by spicules, produced by direct transformation of the epidermis, and hornlike. The selachians possess flat, triangular, sharp spines, grouped in concentric lines and united to the maxillae by a hinge joint which permits their distal inclination, but does not allow them to tilt forward. Thus they act as a trap which does not allow the prey to escape.

The shark, and some rays, have a mandible fitted with some teeth that cut (incisors), and others that triturate.

In the mammalia, tooth variations take place following different lines of specialization. The simple, conical tooth takes on an extra cusp, or develops complicated patterns on its occlusal surface. Especially noteworthy are the teeth of continuous growth, which demonstrate their ectodermic origin and similitude to hair and nails.

Teeth vary in function. Whereas some shear and triturate, others contribute to deglutition, hold or retain the prey, constitute a weapon for attack or defense, are venom phials, or hold the female during copulation. In man teeth attain new possibilities as aids to esthetics and phonetics.

So finally the tooth attains its height of specialization in the mammals, where it becomes an organ designed to prepare the food prior to de-

glutition. This is correct notwithstanding the fact that some mammals such as the anteater do not possess teeth, while others have only one (narwhal) or two teeth (dolphin).

And finally within the upper orders of mammals (man, anthropoids) different dental morphology appears, explained in different ways by different schools of thought.

▼ Anatomy

The epithelial attachment (the attached epithelial cuff)

Balint J. Orban, Harbans Bhatia, John Anton Kollar and Frank M. Wentz. *J.Periodont.* 27:167-180 July 1956

Formerly it was believed that the relation of gingival epithelium to the enamel of the tooth was only one of close approximation, and that a capillary space between the gingival epithelium and enamel extended to the cemento-enamel junction from the time the tooth had erupted into the oral cavity. In 1921, Gottlieb asserted that the epithelium of the gingiva is in organic connection with the enamel surface and that only a shallow crevice exists at the free border of the gingiva.

In 1952 Jens Waerhaug asserted that the epithelial attachment does not exist. He claimed that from the moment a tooth erupts into the oral cavity, the gingival sulcus reaches to the cemento-enamel junction.

Experiments were carried out to determine the existence or nonexistence of an organic attachment of the epithelium to the enamel surface. Six dogs and four adult monkeys were employed. Three types of experiments were conducted, as follows: (1) insertion of a steel blade into the gingival sulcus; (2) creation and positioning of a gingival flap and (3) insertion of a thin plastic strip into the gingival sulcus.

The following conclusions were reached:

1. In young dogs it was impossible to detach the gingiva from the enamel of the tooth without tearing the epithelium or the connective tissue.

2. It was also impossible to insert a thin strip of either steel, plastic or celluloid into the alleged space between epithelium and enamel. Instead, such a strip also caused tears in the epithelium or through the epithelium into the connective tissue.

3. In all these experiments, the injuries caused by the manipulation were clearly and unmistakably visible in carefully prepared sections.

4. Epithelium is not made adherent to the tooth surface by Formalin fixation.

5. The gingival epithelium is in the true sense of the word attached to the enamel surface.

6. The attachment of the epithelium to the tooth should be considered as part of the dentogingival junction.

7. It is suggested that the term "attached epithelial cuff" should be used instead of the term "epithelial attachment."

Anatomic and functional deviations in dentition and jaw development of a chimpanzee skull

(Zur anatomischen und funktionellen Divergenz zwischen der linken und rechten Gebisseite eines Schimpansen)

P. Riethe. *Stoma* 9:93-105 April-June 1956

The skull of a mature male chimpanzee, exhibited at the Museum of Natural Sciences in Frankfurt am Main, was the object of a recent study by the staff of the Dental Institute of the University of Mainz, Germany.

This skull showed remarkable pathologic deviations in dentition and jaw development—on its left side, an extreme closed bite, and on its right side, an open bite. The apes of the Old World (*Anthropoidea* and *Cynomorphae*) have 32 teeth; the apes of the New World (*Cebidae*), 36 teeth. In the chimpanzee skull examined, however, only 28 teeth were present, and neither spaces for the missing teeth nor traces of their dental germs existed.

This anatomic and functional deviation from the norm, present in both sides of the jaws, probably was caused by periodontal disease, insufficient equilibration and metabolic disturbances.

The lack of normal friction, function and pressure in both jaws not only promoted periodontosis

but exerted an excessive and seemingly purposeless stress.

Such an unfavorable dental condition seems to prove that in apes, and also in man, the jaw is an adaptable anatomic unit in which every alteration may produce pathologic consequences.

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Anthropology

New material on man's origins

Pei Wen-Chung. *China Reconstructs* 5:9-10 Aug. 1956

Abundant fossilized remains, covering every stage of human and prehuman development in the last million years, have recently been found in Kwangsi province of South China. The Kwangsi fossils are embedded in caves in the "Karst" limestone hills. These limestone hills were hollowed by water into caves which served as dwelling places for animals and human beings.

Since the Han dynasty, about 2,000 years ago, fossil bones from this region were known by the people as "dragon bones" and were utilized by Chinese pharmacists to make sedatives and styptics. The true nature of "dragon bones" became known in 1840 when R. Owen, a British scientist, obtained some in a Chinese medicine shop and found them to be the fossilized remains of vertebrate animals. In 1935 the Dutch anthropologist, G. H. R. von Koenigswald, examined some "dragon bones" from a medicine store and found three teeth of a giant ape (*Gigantopithecus*). He concluded that the apes of this now-extinct species flourished several hunderd thousand years ago and were twice the size of the modern gorilla. Since the teeth resembled those of human beings more than those of the ape, some anthropologists contended that they had really belonged to a kind of giant man.

The author had led a work team from the laboratory of vertebrate paleontology of the Chinese Academy of Sciences to Nanning in Kwangsi to study fossil bones purchased from local residents. Among the fossils were found seven teeth of *Gigantopithecus*, all of them three times the size of human teeth and larger than those described by von Koenigswald. Also studied were about 700 teeth of the orangutan (*Pongo pygmaeus*) and scores of smaller teeth of an apelike man. Three more *Gigantopithecus* teeth were later located in a layer of red loam beneath a layer of hard breccia from the Middle Pleistocene geologic age (about 400,000 to 600,000 years ago). Further studies may clarify whether *Gigantopithecus* was an ape or was a manlike ape that properly should be called *Gigantanthropus*.

Excavations in a cave in Holung village in Laipin county produced human fossils of the late Paleolithic age, including a skull fragment, an upper jaw with several deeply worn teeth belonging to the same skull, and a single upper molar. In other caves in the same region were unearthed huge but broken fossil teeth, some of which may have belonged to either ape or man.

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Bacteriology

Host-parasite interaction in relation to dental disease

H. W. Sharp and G. W. Burnett. *Norske Tandlaegeforen. Tid.* 66:193-202 April 1956

The total microbial count per cubic centimeter of healthy human saliva is between 43,000,000 and 5,500,000,000. The bacterial concentrations in gingival pockets and plaques are even greater.

Numerically, viridans streptococci (*Streptococcus mitis* and *S. salivarus*) and *Veillonella gazogenes* (anaerobic gram-negative cocci) constitute an overwhelming majority of the salivary flora. As yet, however, it has not been demonstrated clearly that these microorganisms play an important role in the development of dental diseases.

Among the other 26 different microbial strains present in the oral cavity, it is a protozoan, *Endamoeba gingivalis*, which thrives in the human

saliva as it does in a good bouillon for bacterial cultures. This protozoan, however, fails to establish itself on the oral mucous membrane to which it is regularly transported.

Exclusion of "foreign" microorganisms by the antibodies existing in the human saliva is significant for a regulation of the normal oral flora. Prolonged intensive parenteral treatment with antibiotics may suppress the oral flora to the extent that it will be replaced by "enteric" bacilli, such as cribriform bacteria of the family of Enterobacteriaceae such as Proteus, Pseudomonas and Klebsiella, which normally do not appear in the oral cavity.

Alternatively, a yeastlike microorganism, *Candida albicans*, which normally is only a minority member of the oral flora, predominates, and thrush (oral moniliasis) develops.

The majority of the invading microorganisms are transferred to other parts of the human organism through the blood circulation. In most instances, they are quickly destroyed.

In carious lesions, Sharp and Burnett found a heterogeneous flora with a predominance of acid-forming bacteria, especially frequent in enamel caries. Proteolytic strains, however, were missing. After the decalcification of dentin, enterococci, micrococci, significant fractions of anaerobic lactobacilli and anaerobic actinomycetes were found.

There is no evidence that the appearance of caries always is accompanied by the presence of bacterial species not previously existing either in the oral cavity or in specific carious lesions. Bibby reported that the proportion of certain bacterial types, mainly lactobacilli, increases after caries develops. Mouths that are habitually unclean often are free from caries and, conversely, mouths that are kept scrupulously clean frequently are affected seriously by caries (Bunting). The caries potential of the oral flora becomes effective only if the teeth are susceptible and the environmental conditions suitable.

In hamsters and rats, hereditary influences in caries development have been established. No reasons for such a hereditary transmission noted in tooth structures, condition of the saliva and other factors for caries incidence, however, were determined.

In periodontal disease, a biologic disturbance of the equilibrium and an alteration in the environment exist simultaneously. The bacterial phase of this disease is of an endogenous nature. Trauma and chronic mechanical irritations, such as subgingival calculus or poorly fitting dental restorations, may create a focus of a pathologic process. Other causative factors, affecting the resistance of the periodontium, are, as yet, incompletely understood. The defense mechanism consists of the physical barrier of the constantly renewed epithelium, the washing action of the mucosal secretion, the antibacterial action of the enzymes and of other antibacterial substances, antibodies, phagocytoses, and a group of hard-to-define systemic factors that determine cells and tissues.

Caries and periodontal disease result from the interactions of parasitic microbial populations with susceptible host tissues, both conditioned by physical and social environments. Periodontal disease and caries differ from other oral diseases because their microbial determinants always appear to be indigenous and multiple.

Progress toward understanding and control of caries and periodontal disease requires correlated study of the physiology and biochemistry of the oral flora, the tooth structures and the periodontium.

Bacteriology and epidemiology of staphylococci resistant to treatment

(Zur Bakteriologie und Epidemiologie der resistenten Staphylokokken)

B. Warnecke and H. H. Wernicke.
München.med.Wschr. 98:1274-1277
Sept. 21, 1956

At the bacteriologic and serologic department of the German Federal Institute for Hygiene in Bremen, investigations were carried out to determine the sensitivity of pathogenic staphylococci to antibiotic treatment and to evaluate the increasing resistance of these microorganisms to antibiotic agents.

It was established that the individual health conditions play an important part in the susceptibility to infections caused by staphylococci.

The primary carrier frequently is a child with staphylococcal infection who has come for peri-

odic examination to dental and medical offices. Through inhalation of air containing staphylococci, the physician or the dentist, their assistants and other patients may come to harbor these microorganisms in their noses, mouths, throats and lungs. These persons then become either infected or transmitters, and spread the staphylococcal infection by means of droplet contamination.

Individuals—mainly children—living in the same environment with the bacteria carrier or residing in neighboring regions who seem absolutely free from infection may harbor pathogenic bacteria such as *Staphylococcus albus* or *S. aureus*. By normal desquamation of the skin or by breathing, these pathogenic staphylococci spread not only to other persons but to medical and dental offices, to clinics and to hospitals.

▼ Physiology

Lysozyme: its characteristics in human parotid and submaxillolingual saliva

Kirk C. Hoerman, Harold R. Englander and Irving L. Shklair. *Proc.Soc.Exper.Biol.&Med.* 92:875-878 Aug.-Sept. 1956

The fact that human parotid saliva exhibits greater lysozyme activity than the corresponding whole saliva has led to the conclusion that the parotid glands are the major, if not the sole, contributors to the total salivary lysozyme titer.

In this study, saliva samples were collected by methods other than expectoration. Lysozyme activity was determined in sediment-free individual salivary gland secretions.

Lysozyme titers in secretions of the submaxillary and sublingual salivary glands were found to be substantially higher than those in the parotid gland secretions. Parotid saliva lysozyme titers were variable. Means of the groups tested were considered equivocal.

A component of the submaxillolingual saliva, isolated as the "mucopolysaccharide" group, exerted pronounced inhibition on lysozyme activity in parotid saliva. This inhibition was probably competitive in nature.

It is possible that a diminished quality or quantity of salivary mucoid or an abnormally high parotid lysozyme titer could play an important part in the etiology of ulcerative gingival disease.

Male climacteric? (Männliches Klimakterium?)

Boris Belonoschkin, Stockholm. *München.med.Wschr.* 98:1468-1470 Oct. 26, 1956

Within recent years evidence has accumulated which points to a sensitivity of dental and oral tissues to endocrine dysfunctions. These dysfunctions often accompany female climacteric and are important in indicating and contraindicating many therapeutic and surgical procedures in medical and dental practice.

Little is known about the symptoms of male climacteric because these symptoms have been seldom subjected to a systematic investigation.

In men, there is no cessation of the activity of the sex glands because of age. Normally, the testicles show no atrophic alterations, and the generative function may persist until old age.

Subjective symptoms in the female climacteric are always associated with the cessation of the hormonal function of the sex glands. Similar subjective symptoms occasionally are observed in men during the so-called male climacteric. These subjective symptoms in men, however, are not caused by biologic processes, as in women, but are pathologic conditions.

Therefore, it seems scientifically incorrect to speak of a male climacteric.

For dental and medical practice, the emotional disturbances in middle aged men are as significant as those occurring in women during the menopause. Physicians and dentists must be psychologically experienced to sense the temper and mood of these patients. They must be alert and try as nearly as possible, within reason, to adjust their own mood to that of their patients. They must show extreme tolerance for their patients' idiosyncrasies and phobias. They must try to overcome the mental resistance which fre-

quently is increased in patients who are undergoing the changes, described erroneously as male climacteric.

It is important, therefore, that dentists and physicians in general practice make good use of one of the most important of the psychologic principles—compatability—in the treatment of middle aged male patients. This is not only good medical or dental psychology, it is, incidentally, also good business.

▼ Pathology

Moniliasis in the oral cavity

(Neue Beiträge zur Moniliasis in der Mundhöhle)

K. Lelkes, Budapest. *Österr.Zschr.Stomat.* 53:243-249 May 1956

Moniliasis in the oral cavity usually is superimposed on various debilitating conditions or chronic exhausting diseases. Among the group of yeastlike fungi responsible for this disease is the microorganism *Candida albicans*. Several different types of this fungus probably exist which are, as yet, not differentiated.

When the majority of the other microorganisms are destroyed or at least inhibited by antibiotics, *C. albicans* may still flourish, but it is disputable whether or when this fungus becomes pathogenic.

The fact that *C. albicans* tends to develop below the bases of dentures made of rubber, caoutchouc or acrylic resins prompted an investigation to determine the origin of moniliasis in the oral cavity and its possible relation to artificial dentures.

The results of this investigation carried out at the Dental Institute of the University of Budapest, revealed that moniliasis occurs frequently below dental prostheses, on the tongue and on the corners of the mouth. In adult patients, moniliasis most frequently occurs below the denture bases. The appearance of this disease in otherwise healthy and strong persons may be promoted by hypovitaminoses (deficiency of vitamins B, C and K). Peripheral circulation disturbances accompanying the menopause (retrogressive metamorphosis of the sex hormones), diabetes mellitus, obesity and medication with broad spectrum antibiotics may be inciting factors.

Local causes of moniliasis of the oral cavity are disturbances in the microbiologic metabolism, minute lesions, contaminated dentures, decrease in the pH volume, increase in the oral temperature of from 3° to 4° above 37° C., and enzymic decomposition or inadequate saliva secretion.

The lesions of moniliasis in the mouth are similar to those occurring in severe stomatitis. The oral muccus membrane, especially of the tongue and the cheeks, shows numerous whitish or yellowish, poorly defined and slightly elevated patches. Microscopically, these lesions are made up of mycelial threads, leukocytes and nonvital epithelium.

In some instances, *C. albicans* was introduced to the human organism by the use of hypodermic syringes (by drug addicts), and in others by previous traumatic injuries in the oral cavity.

Endothelial myeloma (Das Ewing-Sarkom)

A. Lindemann. *Zahnärztl.Praxis* 7:1 Feb. 1, 1956

Endothelial myeloma, the solitary diffuse endothelioma, is the type often referred to as "Ewing's tumor." This tumor occurs usually in the shafts of long bones and progresses with absorption of osseous structures and thickening of the involved bony regions. Subsequently, other bones may be involved, and metastases to soft parts of the oral cavity occur frequently. Many authors, however, hold that these metastatic neoplasms in structures of the oral cavity can be diagnosed as primary endothelial myelomas. The author challenges this opinion.

Roentgenographically, the enlargements in the bones caused by primary endothelial myeloma are visible in a fusiform outline.

Microscopically, the tumor shows invasions into bone marrow and osseous substance. The tumorous mass consists of sheets of cells in an alveolated arrangement, sometimes poorly and

sometimes well vascularized. Some endothelial myelomas show solid cytoplasms, and in others the cytoplasm appears in vesicular form.

Metastases to other parts of the human organism occur only in the later stages.

As in chloroma, the endothelial myeloma shows no tendency to new bone formation.

Irradiation is temporarily effective, but in the majority of instances, the tumor will recur with fatal outcome.

Even though the prognosis is unfavorable, treatment with radium or other radioactive substances should be utilized. In many instances reported, the tumor is highly susceptible to such a treatment, and recurrence and metastatic formation can be prevented.

Mixed infections of the oral cavity

John B. Macdonald. *Norske Tannlaegeforen.Tid.* 66:188-191 April 1956

Most bacterial infections afflicting man are mixed infections. The development of a group of related oral infections, the so-called "fusospirochetal" infections, depends on the presence of a multiplicity of different microbial types. To the fusospirochetal group belong simple gingivitis, chronic periodontosis, Vincent's infection and gangrenous stomatitis. Inflammation, suppuration and necrosis are symptoms common in these infections, although varying in degree and severity.

Bacteriologic examination of 0.1 ml. of exudate revealed the presence of about 8,000,000,000 microorganisms, among them spirochetes and fusiform bacteria, cocci, gram-positive and gram-negative rods and motile bacteria. Most of these microorganisms were anaerobes.

Little is known about the biochemically important metabolites in mixed infections of the oral cavity. Studies by Schultz-Haudt and Bibby suggest that hyaluronidase and chondroitin sulfatase may be significant, but it is still too early to speculate about where these studies are leading.

Satisfactory methods are now available for identifying the infective components. Although it is established that a mixture of microorganisms is necessary to produce fusospirochetal infections, neither spirochetes nor fusiforms play an important part.

Agents of a mixed infection which has been produced artificially with recombined pure cultures provide adequate material in which the biochemical determinants of such infections can be studied.

Further research unquestionably will reveal the underlying predisposition to the mixed infections in the oral cavity at the cellular level in tissues, which permits these infections to become established.

Hypodontia in the permanent dentition

Hans Grahnén. *Odont.Revy* 7, suppl. 3, 1956, 100 p.

In this report "hypodontia" is used to indicate congenital absence of one or more teeth or tooth germs.

To determine the frequency of hypodontia in a Swedish population and to examine, by family studies, the etiologic significance of genetic factors, two series of persons were studied. Group A consisted of 1,006 school children 11 to 14 years old. Group B consisted of 1,064 students and dental nurses at the Royal Dental School in Malmö ranging in age from 17 to 43 years.

In Group A, the following results were obtained:

1. The frequency of hypodontia (third molars excluded) was 6.1 per cent.

2. The mandibular second bicuspids showed the highest frequency of hypodontia (2.8 per cent) of any tooth group. The maxillary lateral incisors and second bicuspids were next with frequencies of 1.6 and 1.4 per cent respectively.

3. No instances were observed of hypodontia of the maxillary central incisors or first or second molars or the mandibular cuspids or first or second molars.

4. The ratio of congenitally missing teeth between the maxilla and mandible was 48:61. The corresponding ratio between the right and left sides was 55:54.

5. About 85 per cent of the children with hypodontia had either one or two teeth con-

genitally missing. The greatest number of missing teeth was eight.

6. When hypodontia was grouped according to types of teeth, symmetrical hypodontia occurred, on the average, in 49 per cent.

7. The frequency of peg-shaped maxillary lateral incisors was 1.7 per cent.

8. No significant differences existed between the frequency of hypodontia in boys and girls.

In Group B the following results were obtained:

1. The frequency of hypodontia was 5.0 per cent.

2. The mandibular second bicuspids showed the highest frequency of hypodontia (2.3 per cent) of any tooth group. This was followed by the maxillary lateral incisors (1.7 per cent) and the maxillary second bicuspids (1.6 per cent).

3. No hypodontia was found in the maxillary central incisor, cuspid or second molar regions or in the mandibular cuspid or first bicuspid regions.

4. In a total of 117 congenitally missing teeth, the ratio between the maxilla and mandible was 67:50 and between the right and left sides, 62:55.

5. About 79 per cent of those with hypodontia had either one or two teeth congenitally absent. The greatest number of missing teeth was seven.

Parents and siblings of 171 persons with hypodontia were examined. The series (Group AF) comprised 685 persons. In the majority of the parents it was impossible to ascertain whether hypodontia existed. In Group AF the following results were obtained:

1. The over-all frequency of hypodontia (excluding third molars) in parents and siblings of the propositi was significantly higher than in the population as a whole (Group A).

2. No significant differences existed between the frequencies of hypodontia in the two sexes. The mean values, however, were higher for the women.

3. The total number of congenitally missing teeth (excluding third molars) in propositi and their siblings was greater in the maxilla than in the mandible, but the frequency of hypodontia was higher in the mandibular second bicuspid than in the maxillary second bicuspid region.

4. Symmetrical hypodontia occurred, on the average, in 59 per cent when hypodontia in propositi and their siblings was grouped according to types of teeth.

5. The frequency of other defects (ectodermal disturbances) in persons with hypodontia was not greater than in those with no hypodontia.

6. The genetic analysis strongly supports the hypothesis that hypodontia is genetically determined. The simplest explanation is that, in the majority of instances, hypodontia (excluding third molars) is primarily determined by a dominant autosomal gene with incomplete penetrance and variable expressivity. The possibility of several genetic entities being involved cannot be excluded.

Cancer in twins (Krebskranke Zwillinge)

O. von Verschuer. *Deut.med.Wschr.* 81:1456-1459 Sept. 7, 1956

In medical and dental literature, only a few instances of malignant tumors (carcinoma or sarcoma) have been described in which hereditary factors exist.

At the Institute for Human Genetics of the University of Münster, Germany, 90 pairs of twins (26 uniovolar and 64 binovolar) were examined. In this group, either one or both of the twins were afflicted with cancerous neoplasms.

Only in three of the uniovolar pairs of twins was the malignant tumor at the same location; in 12 binovolar pairs of twins, the primary tumor occurred in the same region, but only in three instances in the identical site.

Adding to these data the finding of other authors, it was established that the ratio between similarity and dissimilarity of malignant tumors is as follows: (1) in 120 pairs of uniovolar twins, 21 to 79, and (2) in 287 pairs of binovolar twins, 15 to 85.

There seems to be no significant difference between the cancer incidence in uniovolar and binovolar twins.

Hereditary factors play an important part only in instances in which similarity of site is evident. This hereditary influence, however, appears to be present only in certain types of malignant tumors.

It is suggested that a nonspecific inherited disposition exists in most instances of malignant tumors of twins, especially when the site is identical in the twins. The etiology of a dissimilar occurrence of carcinoma or sarcoma in uniovolar twins, however, remains obscure.

Cleft palate following cortisone therapy in early pregnancy

R. K. Doig and O. McK. Coltman. *Lancet* 271:730 Oct. 6, 1956

The paper by Harris and Ross, describing a possible relation between cortisone therapy in early pregnancy and cleft palate, prompted the authors to record a case.

A married woman, 25 years old, became pregnant while taking 100 mg. cortisone and 400 mg. tolazoline hydrochloride daily after a clinical diagnosis of disseminated lupus erythematosus. The baby was born prematurely, weighing 2 pounds 11 ounces. He died 14 days after birth, from bronchopneumonia. There was a cleft palate which involved the soft tissues; no other developmental abnormality was found.

This patient received a moderate dose of cortisone during the relevant period of development of the palate.

The outcome of all pregnancies where the mother has taken cortisone in the first three or four months of pregnancy should be reported.

Oral mucous membrane manifestations of systemic disease

Alice E. Palmer. *J.D.Med.* 11:187-197 Oct. 1956

In systemic disease with eruptive manifestations, the eruptions of the oral mucous membrane usually are identical with those found on the skin proper, but the constant maceration, heat, moisture, friction and the dissolving action of the saliva alter the appearance of the eruptions.

Oral lesions cannot retain a crust because of the dissolving and macerating effect of the mucosal secretions. The absence of hairs in the oral mucous membrane eliminates the possibility of a large group of cutaneous diseases. The skin also has a large number of sweat glands which are lacking in the mouth; this precludes the development of another large group of manifestations in the mouth.

The mucous membrane, however, has a few distinctive qualities of its own. The presence of mucous glands gives rise to the possibility of diseases affecting them. Also the juncture of mucosa with skin, the mucocutaneous junction, or the vermilion border is subject to special hazards. In the mouth the mucosa is subjected to appliances, movements and contacted agents that are usually quite different from those affecting the skin in general. Even the types of bacteria and parasites which thrive in the mouth are selective by reason of the moisture, pH, heat and other factors. Many lesions on the mucous membrane, if viewed alone and out of context with the lesions which may be on the skin, will go undiagnosed or be misdiagnosed.

Although the skin and mucous membranes exhibit differences, they have some similarities. Both may exhibit inflammations—acute, subacute, or chronic. Both may show manifestations of allergies. Both may be damaged by a host of systemic infections.

The oral mucous membranes may exhibit objectively most of the primary lesions as they occur on the skin, with a few secondary modifications. The subjective symptoms of disease in the mouth are, for the most part, soreness, tenderness, burning, stinging, pain, bad taste and paresthesias. Oral mucous membrane lesions should be treated according to the basic tenet of good medical practice: Do not treat a symptom as such but attempt to see that the underlying disease is properly managed.

Oral manifestations of urticaria, drug eruptions, erythema multiforme, Behçet's disease, dermatitis herpetiformis, pemphigus, lupus erythematosus, periarteritis nodosa, periadenitis mucosa necrotica recurrens, trichinosis, pityriasis rosea, lichen nitidus, the lymphoblastomas, diphtheria, tuberculosis, gonorrhea, tularemia, glanders, various protozoan diseases, yaws, foot and mouth disease, herpes zoster, lichen planus and syphilis are described. Many of these diseases may have their first, and occasionally their only real, manifestation on the oral mucous membranes. By his knowledge of the similarities and differences in

reaction between the oral mucous membranes and the skin, the dentist may be able to classify many of these diseases.

He should be aware of his tremendous responsibility to the patient and to the community in the early detection of disease, and should direct his attention toward the mucous membrane as well as dental abnormalities.

Serum hepatitis following dental procedures: a presentation of 15 cases, including three fatalities

Francis E. Foley and Ralph N. Gutheim.
Ann.Int. Med. 45:369-380 Sept. 1956

In 1952 members of the house staff at the Rochester General Hospital first became aware of the appearance of serum hepatitis after dental procedures. Since this form of hepatitis is preventable, the dental and medical professions should be alerted to the problem.

All patients discharged from the medical service of the Rochester General Hospital during the two year period from June 1, 1953, to May 31, 1955, with the diagnosis of infectious hepatitis or serum hepatitis, were included in the study. Of 57 cases of viral hepatitis, 7 were serum hepatitis after blood or plasma transfusion. Of the remaining 50 patients, 15 reported a history of dental injection during the preceding one to six months. These dental injections consisted of the injection of procaine during the process of extracting teeth in 13 patients and the filling of teeth in two patients. It is believed that the 15 patients with the positive dental injection history had serum hepatitis which was transmitted at the time of the dental procedures by contaminated needles, syringes or procaine.

The observed incubation period was from about 45 to 160 days. Malaise, fatigue and anorexia were the first symptoms encountered in 80 per cent of the dental group of patients. Nausea and abdominal ache were next in frequency. Only one patient of the 15 had a temperature above 100.2° F. during hospitalization. No patient had a chill. The patients ranged in age from 18 through 71 years, 10 being above the age of 30. The three fatalities in the series are discussed.

The 50 hepatitis patients were matched by age at random with 50 patients in the hospital on January 23, 1956, who served as the control group. The incidence of dental injections in the hepatitis group was at least five to seven times as frequent as in the control group.

Establishing the previous dental work is of primary importance in arriving at a prompt probable diagnosis of serum hepatitis. The patient should be asked about any visit to a dentist in the last six months, and specific questions should be asked as to injections or suturing during these visits.

The data presented indicate that in the Rochester General Hospital, 30 per cent of apparent infectious hepatitis instances in adults actually may be instances of serum hepatitis. Of 22 instances of serum hepatitis over a two year period, 15 (or 68 per cent) were caused by exposure at a dentist's, and seven (or 32 per cent) by the administration of blood or plasma. It appears that in Rochester, N.Y., serum hepatitis after dental procedures is a considerable public health problem.

Chemical sterilization should be abandoned. Autoclaving is a choice method for killing the virus. Boiling for more than half an hour may be sufficient. Autoclaving of syringes and needles may not be enough if the procaine itself has been contaminated. Only 0.0001 cc. of contaminated serum is sufficient to produce serum hepatitis. The procaine bottle with its contents should be autoclaved routinely after each procedure in hospital practice, where many different individuals have an opportunity to use one bottle.

Operative dentistry

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Inlays and fillings

A method to reduce pain during cementation of restorations

Ralph W. Ludwick, Jr., and L. M. Lynn. *J.A.D.A.* 53:563-566 Nov. 1956

For the dental patient, cementation is frequently the most painful part of the sequence of operative procedures involving gold restorations. The setting of the cement may be painful and irritating, and teeth may remain extremely sensitive to trauma and to cold for long periods. Generally, the teeth eventually will adjust themselves and become comfortable when subjected to a cold stimulus.

A technic for "conditioning" teeth was developed and has been used for several years at the College of Dentistry, University of Nebraska, to reduce the pain during the cementation of gold restorations.

During the fitting process for the gold restoration, the patient is shown how to proceed in conditioning his tooth to reduce pain. While the restoration is out of the mouth, the patient is given a glass of tap water, 60° to 65° F. in temperature, and is instructed to begin rinsing his mouth with a small amount of water, and to increase gradually the amount of water in the subsequent rinsings as the tooth adjusts to this temperature. Rinsing is continued until the patient can tolerate the 65° F. temperature water on the tooth without discomfort. Usually it takes about two minutes for the patient to condition his tooth to this temperature.

When the tooth is conditioned, the operator isolates the region with gauze and cotton rolls. A cotton pellet is moistened in a dappen dish containing about 4 cc. of 3 per cent hydrogen peroxide U.S.P. This solution is applied to the prepared tooth. A large loose piece of cotton is placed in the prepared cavity, or around the tooth in the case of a crown preparation. Unwarmed air is used to drive the moisture away from the tooth. The rest of the drying is done with small cotton pellets.

The restoration is covered with cement and seated. Sometimes parts of the cavity are covered with cement also. Appropriate tapping with a mallet and blunt instrument facilitates the seating and helps to minimize the film thickness of the cement. The patient bites on a match stick to hold the restoration firm during the setting of the cement. After five minutes the match stick and cotton rolls are removed and the excess cement chipped away.

The pain often experienced during and after cementation has been greatly reduced by this method. In one study involving more than 100 patients the results indicate that the described technic noticeably reduced the pain during the cementation process, and that few teeth were sensitive to cold stimuli after placement of the gold restoration. The conditioned tooth stands moisture evaporation and exposure to air much better than before. Also the chilled tooth will stand the heat generated by the cement setting much better than normally.

Silicate cement fillings for vital anterior teeth

(Über die Versorgung defekter vitaler Frontzähne mittels Silikatzementfüllungen)

W. Ketterl. *Deut.Zahnärztebl.* 10:731-734 Sept. 22, 1956

No filling placed in human teeth remains permanently. When a careful technic is used in the preparation for and the placement of silicate cement fillings, they will last as long as those made with other materials and they are less observable.

No special type of filling is indicated for all cavities. Each filling requires a cavity preparation adapted to the material and technic used.

In Germany, 90 per cent of cavities in anterior teeth are filled with silicate cement. Pulp irritations still occur in sufficient number to cast suspicion on the properties of this filling material.

Manufacturers of silicate cement usually advise dentists to use a cavity varnish. This seems

to be an admission of the presence of an undesirable property in the mixed silicate cement. Some of these recommended varnishes, however, permit dialysis and do not furnish complete protection.

At the Dental Clinic of the University of Kiel, Germany, 100 patients with 360 silicate cement fillings were examined. Those examinations that were made two or five years after insertion of the fillings disclosed the following: (1) acute pulpitis or gangrene, 10 instances; (2) chronic pulpitis or gangrene which already had rendered the pulp nonvital, 6 instances; (3) severely lowered pulp vitality, 14 instances; (4) secondary caries, 141 instances; (5) severe discoloration of the enamel, appearing subsequent to the fillings, 40 instances, and (6) falling out of fillings as a result of material shrinkage, 18 instances.

A high degree of protection for the pulp can be obtained, however, by the use of zinc oxide phosphate cement, provided that all the dentin canals involved are properly covered with phosphate cement.

The effect of temperature and humidity on the setting time of silicate cement has been observed frequently. The use of a warm slab for mixing and an increase in water content produce a more rapid reaction between powder and liquid and accelerate the setting process.

In cavity preparation for silicate cement fillings, the following technic is recommended: (1) the cavities should be prepared with round undercut grooves; (2) the margins should be strong, sharp, smoothly curving with no thin unsupported enamel; (3) the labial margins should be cut drastically until the strong dentin-supported enamel is reached; (4) the pulp should be guarded against chemical irritation, and (5) a suitable cavity lining should be used even when the silicate cement is correctly mixed to a thick consistency, because the amount of free acid is still so great that it can endanger the vitality of the pulp.

Most manufacturers of silicate cement give detailed instructions for mixing. In effect, they insist that the maximum quantity of powder be incorporated in the liquid in a minimum of time. Mixing should be completed in about one minute, and the finished mixture must be thick enough to break when the slab is lifted about half an inch. During spatulation, the mixture should be confined to the smallest possible area of the slab, and under no circumstances should more liquid be added.

The insertion of the mixture into the cavity can be carried out in one minute, after which the mixture can be molded into correct contour and held immovable for about three minutes. This procedure should be timed by the watch and not by guesswork.

Perfect results can be obtained with silicate cement. Faults and disadvantages have been greatly exaggerated because the technics applied were faulty. The danger of pulp irritation, however, is great, and suitable precautions must be taken to prevent it. Damage to the pulp, however, occurs more frequently with self-curing direct acrylic fillings than with silicate cement fillings (Spreter von Kreudenstein).

Although the placement of good silicate cement fillings is time-consuming, any proper restoration requires time.

Polyantibiotic dental cement as a cavity sterilant. In vitro and in vivo report

Maxwell B. Colton and Eugene Ehrlich.
New York D.J. 23:23-30 Jan. 1957

Chemical sterilization of the dentinal cavity has proved inadequate for two reasons: (1) incomplete killing of the bacteria, and (2) injurious effect on the protoplasmic contents of the dentinal tubuli and the pulp.

The authors in a previous paper (1953) showed that the addition of antibiotics, and particularly polyantibiotics, increased the bactericidal effectiveness of dental cements.

Experiments *in vitro* are reported which demonstrate the bactericidal effectiveness of polyantibiotic cement.

In vivo tests confirm the findings; 418 teeth were filled with various cements and the fillings removed in from 4 to 16 weeks. Cuttings from the dentin under each filling were placed in culture tubes and incubated at 37° C. for 48 hours.

Of 210 teeth filled with lithium cement, 186 showed positive growths of organisms before fill-

ing, and 24 were negative and eliminated from further consideration. Of 208 teeth filled with polyantibiotic cement, 194 showed positive growths of organisms before filling, and 14 were negative and eliminated from further consideration.

When the fillings were removed and cultures made, the following results were noted: Of the 186 teeth showing positive growths before filling with lithium cement, 159 showed positive growths of organisms after the removal of fillings and 27 showed no growths. Of the 194 teeth showing positive growths before filling with polyantibiotic cement, 12 showed positive growths of organisms after the removal of fillings and 182 showed no growths.

In this test, 51 teeth had deep cavities where the removal of decay was incomplete. These teeth were filled with polyantibiotic cement. Cultures taken after removal of fillings showed 46 negative and 5 positive growth of organisms.

The addition of polyantibiotics to zinc cements and zinc oxide and eugenol pastes noticeably increases the bactericidal effectiveness.

Reaction of the pulp to resin cements

(Pulpareaksjoner ved bruk av resinsementer)

K. Langeland. *Norske Tannlaegeforen.Tid.* 66:304-308 June 1956

The recently introduced resin cements have been claimed to be superior to phosphate cements, and nonirritating to the pulp.

In order to study the reaction of the pulp to the resin cements, cavity preparations were made in 34 intact first bicuspids and one carious tooth from children 10 to 14 years old. The preparations were made in the gingival third of the buccal surface with diamond stones and steel burs under a constant stream of lukewarm water. Prior to filling, the cavities were rinsed with lukewarm water and dried with cotton and a gentle air stream.

A small amount of cement, mixed according to the manufacturer's instructions, was placed in the cavity which was subsequently filled with amalgam. In some instances the entire cavity was filled with cement.

The teeth were extracted 1 to 393 days after being filled. They were fixed, decalcified in 5 per cent nitric acid, embedded in paraffin, and about 60 sections, 5 microns thick, were cut from each tooth. Each section was examined to determine the extent of the damage to the pulp.

Pathologic changes were observed in all teeth. Aspirated odontoblasts, polymorphonuclear leukocytes, lymphocytes and plasma cells were found in the pulp tissue subjacent to the ends of the dentinal tubules involved in the cavity preparation. Neutrophil leukocytes were seen primarily in the short-range experiments, but in some instances they were present up to 44 days postoperatively. With an increase in observation time, destruction of the connective tissue fibrils and ground substance was observed together with proliferation or degeneration of the cells or both, thus indicating the development of a chronic, irreversible inflammation.

The impression was gained that a relationship exists between the depth of the cavity and the degree of pulpal damage. The reaction also appeared more severe where the entire cavity was filled with cement.

The effect of the resin cements on the pulp resembled that of the self-curing acrylic resins. It is to be expected that a more pronounced reaction would take place where larger areas of dentin were covered with the resin as in the cementing of inlays and crowns.

Special cavity preparation for precision cast gold inlays

(Die innere Verankerung von Gussfüllungen durch Bügel und Krampon)

G. Tallmann. *Zahnärztl.Praxis* 7:7-8 Aug. 15, 1956

Gold was used as material for fillings and inlays as early as 1450. The first gold inlay was made by a gold foil operator who, after he had dislodged a filling during the finishing and polishing process, cemented a cast gold inlay into the cavity. Dentistry has since evolved various scientific technics for casting and inserting gold inlays.

Investigations reveal that many, or all, of the current casting technics are based largely on per-

sonal opinion and not on scientific facts. The most frequently used technics for producing cast gold restorations have objectionable features. Failures can be avoided by adopting only the best features of each technic and by modifying and integrating them to a composite method.

The commonly used technics are as follows (1) the "direct," (2) the "indirect," and (3) the "indirect-direct" technic.

The direct technic produces accurate results but it has the following drawbacks: (1) an excessive chairtime required to finish the wax-up in the mouth; (2) a carving generally inferior to that produced on a model, and (3) a tendency toward distortion of the pattern during removal from the tooth.

The direct and the indirect-direct technics have the advantages of saving chairtime and producing perfect carvings with little distortion. These technics, however, have the following disadvantages: (1) the introduction of over-all errors caused by dimensional changes in materials used for impression, model, wax-up and casting; (2) the considerable time and added expense involved in making dies and models, and (3) the possibility of distortion in removing the wax-up from model and tooth.

By modifying and recombining the desirable features of these technics, it is possible to produce cast gold inlays of the utmost accuracy, and thereby avoid many disadvantages.

An ideal inlay technic should aim at simplicity as well as at technical and physiologic perfection. With a small mechanical mixer, 8 Gm. of accepted investment which can withstand sudden heat is mixed with the proper amount of water. The cup with the hand-spatulated investment is placed in a centrifugal casting machine and centrifuged with about the same force as used for customary castings. This procedure eliminates most of the air bubbles and makes the investment homogeneous. A small amount of investment is placed inside of a ring. The ring then is mounted on an oiled sprue former.

The mounted wax pattern is covered with investment and slightly vibrated. The sprue pin is pushed into the oiled hole of the sprue former until its end touches the bottom.

The oiled wax cylinder is mounted on the ring, filled with investment and vibrated until the wax pattern is covered at least 2 mm. With a heated knife, the wax cylinder is detached perpendicularly to permit unrestricted expansion in every direction.

After the investment has set, the ring, pin and wax cylinder are removed.

The ring then is mounted to the hole drilled in the back plate of the casting, and a piece of cotton is placed at the original sprue hole to catch melted wax.

A medium reducing flame is directed against the small end of the investment and the blowpipe is mounted to a small vise, so that the nozzle remains 2 cm. from the investment. If the proper amount of investment and heat is used, the wax will be expelled in about half a minute. The chamber will become red one minute later.

The flame then can be turned down, and the crucible containing gold is placed in position. The gold is melted after which it is cast in the red hot mold.

When the inlay is finished and the cavity prepared to receive it, the cement is mixed and carried into the cavity and undercuts. The inlay can be inserted. The cement of the core unites with the cement in the cavity, resulting in a solid mass extending from the undercuts to the core. This added retention will be appreciated especially in instances in which the tooth with the inlay is used as an abutment.

Doctoral and Masters' dissertations

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In this column each month are listed recent Doctoral and Masters' dissertations of dental interest, accepted by the dental schools or graduate schools in partial fulfillment for advanced degrees. Copies of many of these theses are available from the schools through interlibrary loan.

The variation of mandibular bone development in the rat resulting from the excision of the anterior bellies of the digastric muscles. *Raymond Lee Cullen. 1955.* M.S. *University of Southern California.*

An evaluation of the effects of bulbarspinal poliomyelitis on the occlusion of the teeth. *Robert George Daniel. 1955.* M.S. *University of Southern California.*

Effect of ultrasonic waves on the tissues of the jaws and teeth of the dog. *Milton J. Knapp. 1956.* M.S. *Georgetown University.*

An investigation of the angio-architecture and duct structure of the parotid and submandibular salivary glands in relation to surgery. *Harvey W. Lyon. 1956.* M.S. *Georgetown University.*

Some physiochemical changes in the properties of agar-agar type duplicating materials and agar-agar on heating. *Peter M. Margetis. 1956.* M.S. *Georgetown University.*

An investigation of tarnish of certain metallic dental restorative materials. *Mohamed Daoud El Tannir. 1956.* M.S.D. *Indiana University.*

Clinical procedures in periodontal therapy. *Frederick E. Walker. 1956.* M.S. *State University of Iowa.*

Complete denture articulation for orthognathous and prognathous cases. *John H. Wormley. 1956.* M.S. *State University of Iowa.*

Experimental carcinogenesis. *Anand P. Chaudhry. 1956.* PH.D. *University of Minnesota.*

The effect of vitamin A deficiency on periodontal tissues of rats. *Duni C. Miglani. 1956.* M.S.D. *University of Minnesota.*

A study of growth of the jaws in children with extensive hypodontia. *Virginia Penaloza. 1956.* M.S.D. *University of Minnesota.*

A cephalometric analysis of the twelve year old male. *Leon Thomas LaSalle. 1956.* M.S. *University of North Carolina.*

An analysis of condyle movement. *James Alonza Leggette, Jr. 1956.* M.S. *University of North Carolina.*

An investigation of the changes in the trabecular pattern of the mandible following the loss of teeth. *John Orlando Neufeld. 1956.* M.SC. *Ohio State University.*

A cephalometric study of the stability of the hyoid bone in the mandibular rest position. *James Edward Phipps. 1956.* M.SC. *Ohio State University.*

Studies on dental calculus formation with a review of the literature. *Bruce Horace Rice. 1956.* M.SC. *Ohio State University.*

The effect of the antihistaminic agents on the inflammatory response following surgical trauma. *Bernard Shaw Snyder. 1956.* M.SC. *Ohio State University.*

Antihistamines in experimental inflammations. *Richard Irvin Weaver. 1956.* M.SC. *Ohio State University.*

The effect of ovariectomy upon the alveolar bone, periodontal membrane, tibia and vertebra of the albino mouse. *Noshir Piroshaw. 1956.* M.D.S. *Tufts University.*

An *in vitro* study on the effect of zinc oxyphosphate cement on the enamel surfaces of teeth. *Herbert Davidson. 1956.* M.S. *Tufts University.*

Anatomy of the jaw development during the embryonic and fetal period (Ricerche sperimentali sui rapporti intermascellari nei primi stadi di sviluppo). *P. Pisani. 1955.* DR.MED.DENT. *Dental Clinic, University of Milano, Italy.*

Diseases of the oral mucous membrane (Affezioni della mucosa orale). *M. Re. 1955.* DR.MED.DENT. *Dental Clinic, University of Milano, Italy.*

Experiments and research on high palate (Ricerche sperimentali sul palato alto). *E. Allaich. 1955.* DR.MED.DENT. *Dental Clinic, University of Milano, Italy.*

Experimental investigations of pathogenesis and treatment methods of caries (Ricerche sulla patogenesi e terapia della carie in campo sperimentale). *G. Olgiati. 1955.* DR.MED.DENT. *Dental Clinic, University of Milano, Italy.*

Plastic surgery of face with flap by method of V. P. Filatova (Plastika defectov litsa stebeltshatym loskutom V. P. Filatova). *A. F. Ivanov. 1955.* CAND. MED. SC. *University of Molotov, U.S.S.R.*

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Giant cell tumor in the upper jaw: report of case (Über einen Fall von Riesenzellgeschwulst des Oberkiefers). *Manfred Hugelmann. 1953.* DR. MED.DENT. *University of Freiburg/Breisgau, Germany.*

The vascular network of the periodontium (Über die Gefässe des Periodontiums). *H. W. Boehl. 1954.* DR.MED.DENT. *University of Greifswald, Germany.*

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